# QUESTION & ANSWER BANK

# 2022-23

# STD 9

# Science

TamilNadu Government

Samacheer Kalvi New Syllabus

## UNIT - 1 MEASUREMENT

### I CHOOSE THE CORRECT ANSWER.

1) Choose the correct one.
   **a) mm<cm<m<km** b) mm>cm>m>km
   c) km<m<cm<mm d) mm>m>cm>km
2) Rulers, measuring tapes and metre scales are used to measure.
   a) mass b) weight c) time **d) length**
3. 1 metric ton is equal to
   a) 100 quintals **b) 10 quintals** c) 1/10 quintals d)1/100 quintals
4. Which among the following is not a device to measure mass?
   **a)Spring balance** b)Beam balance
   c)Physical balance d)Digital balance
5. The kelvin is the basic unit of _____.
   **a) temperature** b) mass c)length d) volume
6. Least count of a vernier caliper is _____ cm
   a) 1 b) 0.1 **c) 0.01** d)0.001
7. An instrument that is used to measure the diameter of a cricket ball is ____
   a) Screw guage b)Meter scale
   **c)Vernier caliper** d) Spring balance
8. S. I unit of mass and weight are _____
   **a) g and kg** b) kg and g c) **kg and N** d) N and kg
9. If no object is placed on the book, then the pointer of the spring balance reads _____
   a) 3 b) 2 c) 1 **d) 0**
10. Mass of 1 ml of water is _____
    **a) 1 g** b) 1 kg c) 1 mg d) 1 cg

### II. FILL IN THE BLANKS .

1. Metre is the unit of **_____. (length)**
2. 1 kg of rice is weighed by_____. **(beam balance)**
3. Thickness of a cricket ball is measured by _____. **(Vernier Caliper)**
4. Radius of a thin wire is measured by _____ **.(Screw Gauge).**
5. A physical balance measures small differences in mass up to **_____ (1mg)**
6. Mass is a **_____** quantity.**(scalar)**
7. The value of an astronomical unit is **_____ (1.496 x10 $^{11}$ m)**
8. S. I unit of electric current is _____. **(ampere)**
9. The precision of vernier caliper is **_____ (0.1 mm)**
10. The percision of screw guage is**_____ (0.001 mm)**

### III. STATE WHETHER TRUE OR FALSE. IF FALSE, CORRECT THE STATEMENT .

1. The S.I unit of electric current is kilogram .- **False**
   **Correct statement :** The S.I unit of electric current is ampere.

2. Kilometre is one of the S.I units of measurement .-**False**
   **Correct statement** : Metre is one of the SI units of measurement.
3. In everyday life, we use the term weight instead of mass. - **True**
4. A physical balance is more sensitive than a beam balance .- **True**
5. One Celsius degree is an interval of 1 K and zero degree Celsius is 273.15 K - **True**
6. With the help of vernier caliper we can have an accuracy of 0.1 mm and with screw guage we can have an accuracy of 0.01 mm - **True.**

## IV. MATCH THE FOLLOWING.

1. a) Length - metre
   b) Mass - kilogram -
   c) Time - second
   d) Temperature - kelvin

2. a) Screw gauge - Coins
   b) Vernier caliper - Cricket ball
   c) Beam balance - Vegetables
   d) Digital balance - Gold ornaments

## V. ASSERTION AND REASON TYPE QUESTIONS.

**Mark the correct answer as:**

a.Both A and R are true but R is not the correct reason.
b.Both A and R are true and R is the correct reason.
c.A is true but R is false.
d.A is false but R is true.

1. **Assertion(A):** The scientifically correct expression is “The mass of the bag is 10 kg”.
   **Reason(R):** In everyday life, we use the term weight instead of mass.
   **(a) Both A and R are true but R is not the correct reason**
2. **Assertion(A):** $0^{o}C$ = 273.16 K. For our convenience we take it as 273 K after rounding off the decimal.
   **Reason(R):** To convert a temperature on the Celsius scale we have to add 273 to the given temperature.
   **(b) Both A and R are true and R is the correct reason.**
3. **Assertion(A):** Distance between two celestial bodies is measured in terms of light year.
   **Reason(R):** The distance travelled by the light in one year is one light year.
   **(d) A is false but R is true.**

## VI. ANSWER VERY BRIEFLY.

1. **Define measurement.**
   Measurement is defined as the determination of the size or magnitude of a quantity.
2. **Define standard unit.**

* A unit is a standard quantity with which the unknown quantities are compared.
* It is defined as a specific magnitude of a physical quantity that has been adopted by law or convention.

3. **What is the full form of SI system ?**
   International System of Units.
4. **Define least count of any device.**
   The smallest measurement which can be measured by any instrument is called least count.
5. **What do you know about pitch of screw guage ?**
   The pitch of the screw is the distance moved by the tip of the screw for one complete rotation of the head. It is equal to 1 mm in typical screw gauges.
   ***Pitch of the screw = $\frac{\text{Distance moved by the Pitch}}{\text{No. of rotations by Head scale}}$***
6. **Can you find th diameter of a thin wire of length 2m using the ruler from your instrument box?**
   No, we cannot find the diameter of a thin wire of length using the ruler.
   But the diameter of the thin wire can be find by using screw guage.

## VII. ANSWER BRIEFLY.

1. **Mention the rules that are followed in writing the symbols of units in SI system.**

* The symbols of the units named after scientists should be written by the initial capital letter. E.g. N for newton, H for henry, A for ampere and W for watt.
* Small letters are used as symbols for units not derived from a proper noun. E.g. m for metre, kg for kilogram.
* No full stop or other punctuation marks should be used within or at the end of symbols. E.g. 50 m and not as 50 m.
* The symbols of the units are not expressed in plural form. E.g. 10 kg not as 10 kgs.
* Accepted symbols alone should be used. E.g. ampere should not be written as amp and second should not be written as sec.

2. **Write the need of a standard unit.**

* Earlier, different unit systems were used by people from different countries.
* At the end of the Second World War there was a necessity to use worldwide system of measurement.
* Hence,SI (International System of Units) system of units was developed and recommended by **General Conference on Weights and Measures at Paris** in 1960 for International usage.

**3. Differentiate mass and weight.**

| S.NO | MASS | WEIGHT |
|---|---|---|
| 1 | It is a fundamental quantity | It is a derived quantity |
| 2 | It has magnitude alone so it is a scalar quantity | It has both magnitude and direction so it is a vector quantity |
| 3 | It is the amount of matter contained in a body. | It is the normal force exerted by the surface on the object against gravitational pull |
| 4 | Remains the same everywhere | Varies from place to place |
| 5 | It is measured using physical balance | It is measured using spring balance |
| 6 | Its unit is kilogram. | Its unit is newton. |

4. **How will you measure the least count of the Vernier Caliper ?**

Least count of the instrument (L.C)= $\frac{\text{Value of one main scale division}}{\text{Total number of vernier scale division}}$

$$L.C = \frac{1mm}{10}$$

$$= 0.1mm$$

$$= 0.01cm$$

**VIII. ANSWER IN DETAIL.**

**1. Explain a method to find the thickness of a hollow tea cup.**

* The pitch, Least count and the type of Zero error of the screw guage are determined.
* The given cup is placed in betweeen two studs.
* The head screw using the ratchat arrangement is firmly rotated until the given cup is held firmly,but not tightly.
* Pitch scale reading (PSR) by the head scale and head scale coincidence (HSC) with the axis of pitch scale,are found.
* The readings are recorded and the experiment is repeated for different positions of the given cup.
* The thickness of the cup is calculated using the formula P.S.R + (HSC X L.C)
* Then the average of the last column of the table is found.

2. **How will you find the thickness of a one rupee coin ?**

* The pitch,Least count and the type of Zero error of the screw guage are determined.
* The given coin is placed in between the two studs
* Rotate the head until the coin is held firmly but not tightly, with the help of the ratchat.
* Note the reading of the pitch scale crossed by the head scale (PSR) and the head scale division that coincides with the pitch scale axis (HSC)
* The width of the coin is given by PSR + CHSR (Corrected HSR). Repeat the experiment for different positions of the coin.

* Tabulate the readings.
* The average of the last column readings gives the width of the coin.

| S.No. | P.S.R (mm) | H.S.C (division) | CHSC = HSC ± ZC (Division) | CHSR = CHSC x LC (mm) | Total reading = PSR + CHSR (mm) |
|---|---|---|---|---|---|
| 1. | | | | | |
| 2. | | | | | mean =___ mm |

## IX. NUMERICAL PROBLEMS .

1. **Inian and Ezhilan argue about the light year. Inian tells that it is 9.46 x10 $^{15}$ m and Ezhilan argues that it is 9.46 x 10 $^{12}$ km. Who is right ? Justify your answer.**

   Speed of Light = $3 \times 10^8 ms^{-1}$

   Seconds in 1 year = $365 \times 24 \times 60 \times 60 = (3.153 \times 10^7$ seconds)

   Total distance in 1 light year = speed × time

   $= 3 \times 10^8 \times 3.153 \times 10^7$

   $= 9.46 \times 10^{15}$ m  (1 m = $10^{-3}$ km)

   So, $9.46 \times 10^{15}$ m is equal to $9.46 \times 10^{12}$ km.

   **Therefore, Inian and Ezhilan both are right.**

2. **The main scale rading while measuring the thickness of a rubber ball Vernier caliper is 7 cm and the Vernier scale coincidence is 6. Find the radius of the ball.**

   **Here, thickness of the rubber ball = diameter of the ball.**

   Main scale reading = 7 cm

   Vernier scale coincidence = 6 cm

   Least count = 0.01 cm

   (Assuming, there is no zero error)

   Diameter of the ball = Main scale reading (MSR) + (Vernier scale coincidence (VC) x least count (LC)) ± ZE

   $= 7 + (6 \times 0.01) \pm 0$

   = 7.06 cm

   Radius of ball = $\frac{\text{Diameter}}{2} = \frac{7.06}{2}$

   = 3.53 cm

   **Hence, radius of the ball is 3.53 cm**

3. **Find the thickness of a five rupee coin with the screw guage, if the pitch scale reading is 1 mm and its head scale coincidence is 68.**

Pitch scale reading = 1 mm
Head scale coincidence = 68
**The thickness of a fire rupee coin = PSR + HSC × L.C ± ZE**
=1 mm + 68 × 0.01 mm
=1 mm + 0.68 mm
=1.68 mm

4. **Find the mass of an object weighing 98 N.**

\ We know that, gravity =9.8 $ms^{-2}$
Given, weight = 98 N
Weight = mass × gravity
mass = $\frac{\text{weight}}{\text{gravity}}$
$= \frac{98}{9.8}$
=10kg

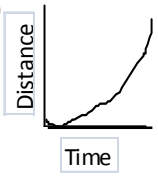
**Hence, mass of the object is 10 kg**

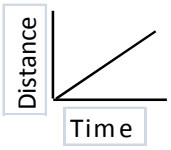
## UNIT : 2 MOTION

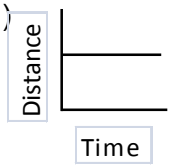
### I. CHOOSE THE CORRECT ANSWER.

1. The area under velocity - time graph represents the _____
   a) velocity of the moving object **b) displacement covered by the moving object** c) speed of the moving object d) acceleration of the moving object
2. Which one of the following is most likely not a case of uniform circular motion?
   a) Motion of the earth around the sun
   b) Motion of a toy train on a circular track
   **c) Motion of a racing car on a circular track**
   d) Motion of a hour's hand on the dial of the clock.
3. Which of the following graph represents uniform motion of a moving particles?

a) 

b) 

**c)** 

d) 


4 The centrifugal force is ___
   a) a real force b) the force of reaction of centripetal force
   **c) a virtual force** d) directed towards the centre of the circular path.
5. The rate of change of displacement
   a) Speed **b) Velocity** c) acceleration d) retardation

6. A scalar quantity has
   **a) magnitude only** b) direction only c) both d) none
7. When an object undergoes acceleration
   a) there is always an increase in its velocity b) there is always an increase in its speed **c) a force always acting on it.** d) all of the above
8. Unit of acceleration is ____
   a) $ms^{-1}$ **b)$ms^{-2}$** c) ms d) $ms^2$
9. Rest and Motion of body are _____
   a) non relative b) non related **c)relative** d) none
10. The relation between displacement and time is given by the equation of ___
    a) $v^2 = ut + at$ **b)$s = ut + 1/2at^2$** c) $v = s/t$ d)$v^2=u^2 + 2as$

## II. FILL IN THE BLANKS.

1. Speed is a _____(**Scalar**) quantity whereas velocity is a _____quantity. **(vector)**
2. The slope of the distance - time graph at any point gives_____ **.(speed**)
3. Negative acceleration is called_____ **(retardation)**.
4. Area under velocity - time graph shows_____ **.(displacement**)
5. The motion of the bus is_____ **.(non uniform motion)**
6. The equation v = u + at gives information as_____ **(velocity is a function of time).**
7. Distance travelled by a freely fallling body is proportional to____
   **(square of the time of fall)**
8. When a body moves uniformly along the circle then its velocity changes
   **(but speed remains the same)**
9. The values of acceleration for a body at rest is _____ **(zero).**
10. From v - t graph,_____ can be calculated.**(displacement)**

## III. STATE WHETHER TRUE OR FALSE. IF FALSE, CORRECT THE STATEMENT.

1. The motion of a city bus in a heavy traffic road is an example for uniform motion **- False**
   **Correct statement :** The motion of city bus in a heavy traffic road is an example for non uniform motion**.**
2. Acceleration can get negative value also **- True**
3. Distance covered by a particle never becomes zero but displacement becomes zero **- True**
4. The velocity-time graph of a particle falling freely under gravity would be a straight line parallel to the X- axis **- False.**
   **Correct statement** : The velocity time graph of a particle falling freely under gravity would be a straight line perpendicular to the x- axis
5. If the velocity time graph of a particle is a straight line inclined to X - axis then its displacement-time graph will be a straight line **- True.**

## IV. ASSERTION AND REASON TYPE QUESTIONS.

**Mark the correct choice as:**

a. If both assertion and reason are true and reason is the correct explanation of assertion.

b. If both assertion and reason are true and reason is not the correct explanation of assertion.

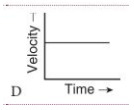
c. If assertion is true but reason is false.

d. If assertion is false but reason is true.

1. **Assertion**: The accelerated motion of an object may be due to change in magnitude of velocity or direction or both of them.
   **Reason**: Aceeleration can be produced only by change in magnitude of the velocity. It does not depend the direction.
   **(c) If assertion is true but reason is false.**
2. **Assertion**: The Speedometer of a car or a motor-cycle measures its average speed.
   **Reason**: Average velocity is equal to total displacement divided by total time taken.
   **(d) If assertion is false but reason is true.**
3. **Assertion**: Displacement of a body may be zero when distance travelled by it is not zero.
   **Reason**: The displacement is the shortest distance between initial and final position.
   **(a) If both assertion and reason are true and reason is the correct explanation of assertion**.

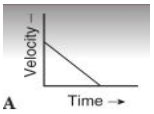
## V MATCH THE FOLLOWING.

a) Motion of a body covering equal distances in equal interval of time -

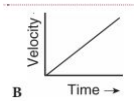



b) Motion with non uniform acceleration -


c) Constant retardation -




d) Uniform acceleration -



## VI. ANSWER BRIEFLY.

**1. Define velocity.**

Velocity is the rate of change of displacement.It is a vector quantity.
The S. I unit of velocity is $ms^{-1.}$

**Velocity = Displacement / Time taken.**

2. **Distinguish distance and displacement.**

| S.No | DISTANCE | DISPLACEMENT |
|---|---|---|
| 1. | The actual length of the path travelled by a moving body irrespective of the direction is called the distance | The change in position of a moving body in a particular direction. |
| 2. | It is a scalar quantity having magnitude only. | It is a vector quantity having both magnitude and direction |

**3. What do you mean by uniform motion ?**

An object is said to be in uniform motion if it covers equal distances in equal intervals of time.

**4. Compare speed and velocity.**

| S.No | SPEED | VELOCITY |
|---|---|---|
| 1) | It is the rate of change of distance with respect to time. | It is the rate of change of displacement with respect to time |
| 2) | It is a scalar quantity | It is a vector quantity |
| 3) | The SI unit of speed is $ms^{-1}$ | The SI unit of velocity is $ms^{-1}$ |
| 4) | Speed= Distance/Time | Velocity= Displacement/Time taken |

**5 What do you understand about negative acceleration ?**

* If velocity decreases with time the value of acceleration is negative.
* It is also known as retardation (or) deceleration.

**6. Is the uniform circular motion accelerated, Give reasons for your answer.**

When an object is moving with a constant speed along a circular path,the change in velocity is only due to the change in direction. Hence, it is accelerated motion.

**7. What is meant by uniform circular motion ? Give two exampls of uniform circular motion ?**

When an object moves with constant speed along a circular path,the motion is called uniform circular motion.

Ex.* Revolution of earth around the Sun.
* Revolution of Moon around the Earth.

## VII. ANSWER IIN DETAIL :

1. **Derive the equation of motion by graphical method.**

**The initial velocity of the object = u = OD = EA**

**The final velocity of the object = v = OC = EB**

**Time = t = OE = DA**

Also from the graph we know that, AB = DC

**First equation of motion**

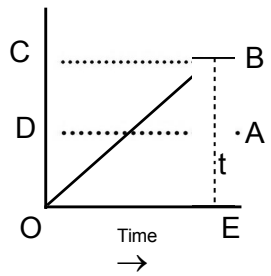
By definition, acceleration = $\frac{\text{change in velocity}}{\text{time}}$

$= \frac{\text{(Final velocity – Initial velocity)}}{\text{time}}$

$= \frac{\text{(OC – OD)}}{\text{OE}}$

$a = \frac{DC}{t}$

$DC = AB = at$




From the graph EB =EA + AB

$v = u + at$ ….(1)

**Second equation of motion**

From the graph the distance covered by the object during time t is given by the area of quadrangle DOEB

s= area of the quadrangle DOEB

s = area of the rectangle DOEA + area of the triangle DAB

= ( l x b) + (1/2x at x t)

$s= ut + \frac{1}{2} at^2$ —(2)

**Third equation of motion**

From the graph the distance covered by the object during time t is given by the area of the quadrangle DOEB. Here DOEB is a trapezium. Then

s = area of trapezium DOEB

s= 1/2 × sum of length of parallel side × distance between parallel sides

= 1/2 × (OD + BE) × OE

s = 1/2 × (u + v) × t

Since a = (v – u) / t or t = (v – u)/a

Therefore = 1/2 × (v + u) × (v – u)/a .

$s= \frac{1}{2a}(v+u)(v-u)$

$s= \frac{1}{2a}(v^2-u^2)$

$2as = v^2-u^2$

$v^2=u^2+2as$ ___(3)

1st equation of motion $\Rightarrow V = u+at$

2nd equation of motion $\Rightarrow S = ut + \frac{1}{2}at^2$

3rd equation of motion $\Rightarrow v^2 = u^2 + 2as$

**2. Explain different types of motion.**

**Different types of motion.**

* **Linear motion** : The motion of an object along a straight line is known as linear motion Ex. car moving on a straight road.
* **Circular motion** : The motion of an object in a circular path is known as circular motion.Ex. Earth revolving around the sun.
* ***Oscillatory motion*** : Repetitive to and fro motion of an object at regular interval of time is called as oscillatory motion.
  Ex. Motion of pendulum of a clock.
* **Random motion** : The disordered or irregular motion of a body is called random motion.Ex. Movement of fish under water.

## VIII. EXERCISE PROBLEMS.

1. **A ball is gently dropped from a heightof 20 m. If its velocity increases uniformly at the rate of 10 ms $^{-2}$ with what velocity will it strike the ground ? After what time will it strike the ground?**

Here we have

| | | |
|---|---|---|
| Initial velocity, | (u) | = 0 |
| Distance, | (s) | = 20m |
| Acceleration, | (a) | =10m/s$^2$ |
| Final velocity, | (v) | = ? |
| Time, | (t) | = ? |
| We know that, | $v^2$ | = $u^2$ + 2as |
| | $v^2$ | = (0)+(2x10x20) |
| | $v^2$ | = 400 m$^2$s$^2$ |
| | $v^2$ | = 400 m$^2$s$^2$ ( squarring on both sides) |
| | v | = 20 ms$^{-1}$ |

**Final velocity of the ball (v) = 20 ms$^{-1}$**

Time taken by the ball to strike (t) = $\frac{(20-0)}{10}$

$$t = \frac{20}{10}$$

t = 2 seconds

Time taken to reach the ground = **2s**

2. **An athlete completes one round of a circular track of diameter 200m in 40 s. What will be distance covered and the displacement at the end of 2m and 20s ?**

Given

| | | | |
|---|---|---|---|
| The diameter of the circular track | | = | 200 m |
| | Radius (r) | = | 200/2 |
| | r | = | 100 m |
| Time is taken by an athlete to complete one round = | | | 40 s |
| | Displacement | = | ? |
| | Speed | = | Distance/Time |
| Total time athlete moves 2 min 20 seconds | | =(2 × 60 + 20)=140 seconds | |

**Need to find the distance covered in one round**

Distance covered in one round = **Circumference of circle=**$2\prod r$

Distance covered in one round = 2

Distance covered in one round = $2 \times 100\prod$

Distance covered in one round =$200\prod$

Time taken by an athlete to complete one round = 40 seconds.

Number of rounds completed in 140s =140/40

Number of rounds completed in 140s = 35

Distance covered = 3.5 × circumference

Distance covered = $3.5 \times 2\prod r$

Distance covered = $3.5 \times 2 \times 3.14 \times 100$

Distance covered = 2200 m

Hence, the distance covered at the end of 2 min 20 seconds is 2200 m or 22 km.

And displacement is 200 m as it returns to the initial position

**3) A racing car has a uniform accelerartion of $4ms^{-2.}$ What distance it covers in 10S after the start?**

Here we have

| | | |
|---|---|---|
| acceleration, | a | = $4m/s^2$ |
| Initial velocity | u | = 0 |
| time | t | = 10s |
| Distance (s) covered | = | ? |
| We know that, | s | = ut +½ $at^2$ |
| | | =$0x10+1/2x4(10)^2$ |
| | | =0+1/2x4x100 |
| | | s=200m |

**Distance travelled by the racing car in 10s is 200m**.

## UNIT - 3 FLUIDS

### I. CHOOSE THE CORRECT ANSWER.

1. The size of an air bubble rising up in water
   a) decreases **b) increases**
   c) remains same d) may increase or decrease
2. Clouds float in atmosphere because of their low
   **a) density** b) pressure c) velocity d) mass
3. In a pressure cooker, the food is cooked faster because
   a) increased pressure lowers the boiling point
   **b) increased pressure raises the boiling point**
   c) decreased pressure raises the boiling point
   d) increased pressure lowers the melting point
4. An empty plastic bottle closed with an airtight stopper is pushed down into a bucket filled with water. As the bottle is pushed down,there is an increasing force on the bottom. This is because,
   a) more volume of liquid is displaced b) more weight of liquid is displaced
   **c) pressure increases with depth** d) All the above

5. Intermolecular forces are stronger in _____
   a) gases b) liquids **c) solids** d) all the above
6. Water (or) liquids exert pressure on _____
   a) upward direction b) Downward direction
   c) Lateral direction **d) All the above**
7. Saccharometer is used to measure the density of ____ in a liquid.
   a) milk **b) sugar** c)Alcohol d) Ether
8. Fluids in general are _____
   a) Gases b)Liquids
   **c) Gases or Liquids** d) None of these
9. The principle of "Hydrostatic balance" was devised by ____
   a) Torricelli b) Pascal **c) Archimedes** d) Newton
10. If there were no gravity, which of the following will not be there for fluid ?
    a) Viscosity b) Density c) Pressure **d) upthrust**

## II. FILL IN THE BLANKS.

1. The weight of the body immersed in a liquid appears to be ____ than its actual weight.**(less)**
2. The instrument used to measure atmospheric pressure is _____**( Barometer )**
3. The magnitude of buoyant force acting on an object immersed in a liquid depends on____ of the liquid **(density)**
4. A drinking straw works on the existence of _____ **(atmospheric pressure )**
5. It is easy to compress a gas whereas liquids are _____ (**Incompressible)**
6. The pressure in mines is ____ than sea level. **(greater)**
7. Hydrometer is based on the principle of _____ **(flotation)**
8. The air pressure at sea level is referred as _____ (**Atmospheric pressure).**
9. _____ is the instrument used to measure the atmospheric pressure.**(Barometer)**
10. The Lactometer works on the principle of ___ of milk.**(gravity)**

## III. STATE WHETHER TRUE OR FALSE. IF FALSE, CORRECT THE STATEMENT.

1. The weight of fluid displaced determines the buoyant force of an object.- **True**
2. The shape of the object helps to determine whether the object will float or not. **False**
   **Correct statement** : The density of an object helps to determine whether the object will float or not.
3. The foundation of the high - rise buildings are kept wide so that they may exert more pressure on the ground. - **False**
   **Correct statement** : The foundation of the high - rise buildings are kept wide so that they may exert less pressure on the ground.
4. Archimede's principle can also be applied to gases. - **True**
5. Hydraulic press is used in the extraction of oil from oil seeds. - **True**

## IV. MATCH THE FOLLOWING..

| | | | |
|---|---|---|---|
| 1. | Density | - | Mass/Volume |
| 2. | 1 gwt | - | 980 dyne |
| 3. | Pascal's law | - | Pressure |
| 4. | Pressure exerted by a fluid | - | $h\rho g$ |
| 5. | Lactometer | - | Milk |

## V. ANSWER IN BRIEF.

**1. On what factors the pressure exerted by the liquid depends on ?**

The pressure exerted by the liquid depends on the

* Depth
* Density of the liquid
* Acceleration due to gravity.

**2. Why does an helium balloon float in air ?**

. Helium balloon floats in air because helium gas has less density than air.

**3. Why it is easy to swim in sea water than in river water ?**

The density of sea water is more than the density of river water due to its high salt content ,as salt water provides more buoyant force than fresh water .
So it is easy to swim in sea water than river water.

**4. What is meant by atmospheric pressure ?**

The pressure exerted by the air on the earth's atmosphere is called atmospheric pressure.

**5. State Pascal 's law.**

Pascal's law states that the external pressure applied on an incompressible liquid is transmitted uniformly throughout the liquid.

## VI. ANSWER IN DETAIL.

1. **WIth an appropriate illustration prove that the force acting on a smaller area exerts a greater pressure**.

* When we stand on loose sand. our feet go deep into the sand but when we lie down on the sand our body will not go that deep into the sand.
* In both the cases of the above activity, the force exerted on the sand is the weight of our body which is the same.
* This force acting perpendicular to the surface is called thrust.
* When we stand on loose sand, the force is acting on an area equal to the area of our feet.
* When we lie down, the same force acts on an area of our whole body, which is larger than the area of our feet.
* Therefore, the effect of thrust, depends on the area on which it acts.

2. **Describe the construction and working of mercury barormeter.**

A mercury barometer, is first designed by an Italian **Physicist Torricelli**.
The instrument used to measure atmospheric pressure is called barometer.

**CONSTRUCTION:**

* A mercury barometer consists of a long glass tube (closed at one end, open at the other) filled with mercury and turned upside down into a container of mercury.
* This is done by closing the open end of the mercury filled tube with the thumb and then opening it after immersing it in to a trough of mercury .

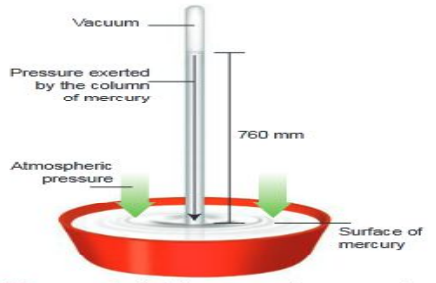



Figure 3.6 Mercury barometer

**WORKING MECHANISM:**

* The barometer works by balancing the mercury in the glass tube against the outside air pressure.
* If the air pressure increases, it pushes more of the mercury up into the tube and if the air pressure decreases, more of the mercury drains from the tube.
* As there is no air trapped in the space between mercury and the closed end, there is vacuum in that space.
* Vacuum cannot exert any pressure. So the level of mercury in the tube provides a precise measure of air pressure which is called atmospheric pressure

**3. How does an object's density determine whether the object will sink or float in water ?**

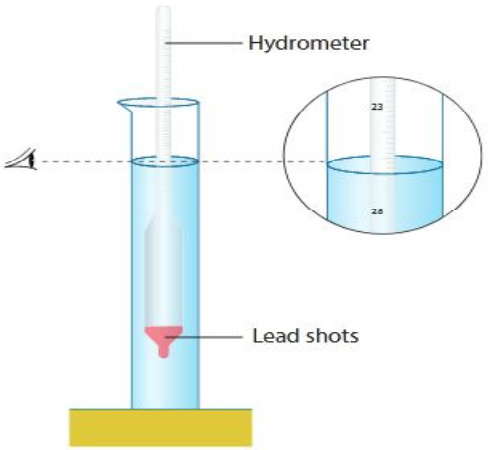
* The sinking or floating of an object is determined by density of the object compared to the density of liquid.
* If the density of a substance is less than the density of the liquid, it will float.
  For eg. Piece of wood which is less denser than water will float into it.
* If density of an object is more than the density of liquid, the object will sink
  Eg. stone sinks in water.

**4. Explain the construction and working of hydrometer with diagram.**

Hydrometer is based on the principle of flotation.It is used for measuring the density or relative density of the liquid.

**CONSTRUCTION:**

* Hydrometer consists of a cylindrical stem having a spherical bulb at its lower end and a narrow tube at its upper end.
* The lower spherical bulb is partially filled with lead shots or mercury. This helps hydrometer to float vertically in liquids.
* The narrow tube has markings so that relative density of a liquid can be read directly.




**WORKING:**

* The liquid to be tested is poured into the glass jar.
* The hydrometer is gently lowered in to the liquid until it floats freely.
* The reading gives the relative density of the liquid.

**5. State the laws of flotation**

**Laws of flotation :**

* The weight of a floating body in a fluid is equal to the weight of the fluid displaced by the body..
* The centre of gravity of the floating body and the centre of buoyancy are in the same vertical line.

## VII. ASSERTION AND REASON TYPE QUESTION.

**Mark the correct answer as:**

a. If both assertion and reason are true and reason is the correct explanation of assertion.
b. If both assertion and reason are true and reason is not the correct explanation of assertion.
c. If assertion is true but reason is false.
d. If assertion is false but reason is true.

1. **Assertion**: To float, body must displace liquid whose weight is equal to the actual weight.
   **Reason**: The body will experience no net downward force in that case.
   **(a): If both assertion and reason are true and reason is the correct explanation of assertion.**
2. **Assertion**: Pascal's law is the working principle of a hydraulic lift.
   **Reason**:Pressure is thrust per unit area.
   **(b): If both assertion and reason are true and reason is not the correct explanation of assertion**.

## VIII. NUMERICAL PROBLEMS.

**1. A block of wood of weight 200g floats on the surface of water. If the volume of block is 300 $cm^3$ .Calculate the upthrust due to water.**

Weight of wood block, m = 200g
Volume of the wood block, v = 300 $cm^3$
upthrust due to water = weight of wooden block
w = mg
= 200 x $10^{-3}$ kg x 9.8 $ms^{-2}$
= 0.2 x 9.8
upthrust = 1.96 N

**2. Density of mercury is 13600 $kgm^{-3}$. Calculate the relative density.**

$$\text{Relative Density} = \frac{\text{Density of mercury}}{\text{Density of water at } 4^0 \text{ c}}$$

$$= \frac{13600}{1000}$$

$$= \frac{136}{10}$$

**Relative density = 13.6**

**3. The density of water is 1g $cm^{-3}$. What is its density in S.I. units?**

Density =1 g/$cm^3$ (CGS unit)
Density of water in SI units = $10^{-3}$ kg/$(10^{-2}m)^3$
= $10^{-3}$ kg/$10^{-6}m^3$
=$10^{-3}x10^6$ kg/$m^{-3}$
=$10^3$ $kgm^{-3}$
Density of water in SI units = 1000 kg/$m^{-3}$

**4. Calculate the apparent weight of wood floating on water if it weighs 100g in air.**

Apparent weight =Weight of the body – Weight of liquid
= 100 – 100 (Since the body is floating the two are equal).
= 0
**So, apparent weight is zero.**

## IX. HIGHER ORDER THINKING SKILLS.

**1. How high does the mercury barometer stand on day when atmospheric pressure is 98.6 kPa?**

Pressue of Atmospheric Patm = 98.6 k Pa
Density of mercury , $r_{Hg}$ = 13.6 x $10^3$ kg/$cm^3$
Acceleration due to gravity, g = 9.8 m/$s^2$
Pressure, P atm = h x$\rho_{Hg}$ x g

$$= \frac{Patm}{\rho_{Hg} \times g}$$

$$= \frac{98.6 \text{ k Pa}}{(13.6 \times 10^3) \times (9.8\ ms^{-2})}$$

$$= \frac{98.6 \times 10^3 Pa}{(13.6 \times 10^3) \times (9.8\ ms^{-2})}$$

**Height of the Barometer , h = 0.7397m**

**2. How does a fish manage to rise up and move down in water?**

* Fish has an internal swim bladder which is filled with gas.
* When it needs to rise or descend, it changes the volume and its density by filling this bladder with oxygen collected from the surrounding water through gills.
* When the bladder is filled with oxygen gas, the fish has a greater volume, with minimal increase in weight.
* When the bladder is expanded, it displaces more water and so experiences a greater force of buoyancy.
* When the bladder is completely inflated, the fish has maximum volume and is pushed to the surface.
* When the bladder is completely deflated, the fish has minimum volume and sinks to the ocean floor.

**3. If you put one ice cube in a glass of water and another in a glass of alcohol, what would you observe ? Explain your observstions**

Ice floats in water because ice is less dense than water. It sinks in alcohol because it is denser than alcohol.

**4. Why does a boat with a hole in the bottom would eventually sink ?**

A boat with a hole at the bottom allows water to enter it, thus increasing its weight and hence it sinks.

As water starts entering the boat through the hole, the boat starts to get heavier, so it starts to sink, trying to displace more water.

But the water keeps coming as the hydrostatic pressure at the hole is always higher than the atmospheric pressure pushing down on the surface of the water in the boat.

## UNIT - 4 ELECTRIC CHARGE AND ELECTRIC CURRENT

### I. CHOOSE THE CORRECT ANSWER.

1. In current electricity, a positive charge refers to,
   a) presence of electron — b) presence of proton
   **c) absence of electron** — d) absence of proton
2. Rubbing of comb with hair
   a) creates electric charge — **b) transfers electric charge**
   c) either (a) or (b) — d) neither (a) or (b)
3. Electric field lines _____ from positive charge and _____ in negative charge.
   a) start; start — **b) start; end** — c) end; end
4. Potential near a charge is the measure of its _____ to bring a positive charge at that point.
   a) force — b) ability — c) tendency — **d) work**
5. Heating effect of current is called,
   **a) Joule heating** — b) Coulomb heating
   c) Voltage heating — d) Ampere heating
6. In an electrolyte the current is due to the flow of
   a) electrons — b) positive ions
   **c) both (a) and (b)** — d) neither (a) nor (b)

7. Electroplating is an example for
   a) heating effect **b) chemical effect**
   c) flowing effect d) magnetic effect
8. Resistance of a wire depends on,
   a) temperature b) geometry c) nature of material **d)all theabove**
9. The resistance of a straight conductor is independent of
   a) temperature b) material
   c) cross sectional area **d) shape of cross section**
10. The resistance of a conductor is R. If its length is doubled, then its new resistance will be
    a)R **b)2R** c)4R d)8R

## II. MATCH THE FOLLOWING.

1. Electric charge - coulomb
2. Potential difference - volt
3. Electric field - newton per coulomb
4. Resistance - ohm
5. Electric current - ampere

## III STATE WHETHER TRUE OR FALSE. IF FALSE CORRECT THE STATEMENT.

1. Electrically neutral means it is either zero or equal positive and negative charges. **True**
2. Ammeter is connected in parallel in any electric circuit. - **False**
   **Correct Statement**: Ammeter is connected in series in any electric circuit.
3. The anode in electrolyte is negative. - **False**
   **Correct Statement**: The anode in electrolyte is positive .
4. Current can produce magnetic field .- **True**

## IV. FILL IN THE BLANKS.

1. Electrons move from _____potential to ____potential.**(higher, lower )**
2. The direction opposite to the movement of electron is called _____ current. **(conventional)**
3. The e.m.f of a cell is analogues to ____ of a pipe line.**(water pump**)
4. The domestic electricity in India is an ac with a frequency of ___Hz. **(50)**
5. The number of electrons constituting 1 coulomb charge is _____(**$6.25 \times 10^{18}$**)
6. Electric fuse is a wire made up of a material having ____ melting point. **(low)**
7. ____ is the only non-metal that is a good conductor of electricity. **(Graphite)**
8. Electric charge is _____ in nature. **(additive)**
9. Electric lines of force are ____lines**.(imaginary)**
10. Trip switch is a _____ safety device. **(electro mechanical)**

## V. CONCEPTUAL QUESTIONS.

**1. A bird sitting on a high power electric line is still safe. How?**

* Birds sit on power lines and not get electric shocks because the electricity is always looking for a way to get to the ground.

* The birds are not touching the ground or anything in contact with the ground, so the electricity will stay in the power line .

**2. Does a solar cell always maintain the potential across its terminals constant?Discuss.**

* Solar cell delivers a constant current for any given illumination level, while the voltage is determined by the load resistance potential in a solar sell depends on the intensity of the solar radiation.
* Since the intensity of solar radiation is not always constant, the potential across its terminal is also not constant.

**3. Can electroplating be possible with alternating current?**

Electroplating cannot be possible with alternating current because it is the process of the continous flow of ions.

## VI. ANSWER THE FOLLOWING :-

**1. On what factors does the electrostatic force between two charges depend?**

* Value of charges on them
* Distance between them and
* Nature of medium between them

**2. What are electric lines of force?**

The lines representing the electric field are called electric lines of force

**3. Define electric field.**

Electric field is the region around a charged body within which its influence can be experienced.i.e within which it can attract or repel another charged body.

**4. Define electric current and give its unit**

* The electric current is defined as the rate of flow of electric charge through any section of a conductor.
* Electric current , $I = q / t$
* Its SI unit is ampere (A)

**5. State Ohm's law**

Ohm's law states that the current passing through a conductor is directly proportional to the potential difference across its ends, provided the physical conditions like temperature, density, etc, remain unchanged

$$V = IR$$

**6. Name any two application which work under the principle of heating effect of current**

Electric heating appliances like iron box, water heater, toaster, etc.

**7. How are the home appliances connected in general, in series or parallel. Give reasons**

The home appliances are connected in parallel connections.

**REASON:**

* Each appliances will get the full voltage.
* Each appliances can be put on or off independently.

**8. List the safety features while handling electricity**

* Do not touch the bare wire. Use safety glows and stand on insulating stool or rubber slippers while handling electricity.
* Do not connect too many electrical devices to a single electrical socket.
* Always use the electrical appliances according to the power rating of the device like ac point,TV point, microwave oven point etc.
* Keep the place, where there is electricity, out of moisture and wetness as it will lead to leakage of electric current.
* The electrical sockets are to be kept away from the reach of little children who do not know the dangers of electricity.

## VII EXERCISES.

**1. Rubbing a comb on hair makes the comb get -0.4c.**

**a) Find which material has lost electron and which one gained it**

Hair has lost the electron. The comb has gained the electron.

**b) Find how many electrons are transferred in this process.**

Charge of 1 electron, e $= 1.6 \times 10^{-19}C$

q $=ne$ or $n = q/e$

n $= \frac{0.4}{1.6} \times 10^{-19}$

$= 0.25 \times 10^{19}$

$=2.5x10^{18}$

**$2.5 \times 10^{18}$ electrons are transferred in this process.**

**2. Calculate the amount of charge that would flow in 2 hours through an element of an electric bulb drawing a current of 2.5A**

Current I = 2.5A

time t = 2 hours= 2 x 3600 sec = 7200s

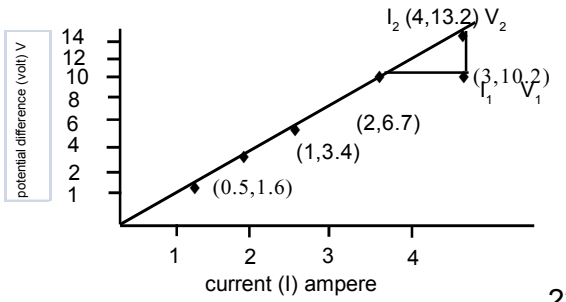
Amount of charge q = I x t

=2.5 x 7200 = 18,000 C

**3. The values of current (I) flowing through a resistance for various potential differences V across the resistor are given below. What is the value of resistor?**

| I (ampere) | 0.5 | 1.0 | 2.0 | 3.0 | 4.0 |
|---|---|---|---|---|---|
| V (volt) | 1.6 | 3.4 | 6.7 | 10.2 | 13.2 |

**[Hint: plot V-I a graph and take slope]**




**Resistance of the resistor**

$R_1$ $=V_2-V_1 / I_2-I_1$

$= 13.2 - 10.2/4 - 3$

$= 3 / 1 = 3W$

R $=3W$

## UNIT - 5 MAGNETISM AND ELECTROMAGNETISM

### I. CHOOSE THE CORRECT ANSWER.

1. Which of the following converts electrical energy into mechanical energy?
   **a) Motor** b) Battery c) Generator d) Switch
2. Transformer works on
   **a) AC only** b) DC only c) Both AC and DC
3. The part of the AC generator that passes the current from the armature coil to the external circuit is
   a) field magnet b) split rings c) slip rings **d) brushes**
4. The unit of magnetic flux density is
   a) weber b) weber/metre
   **c) weber/meter$^2$** d) weber.meter$^2$
5. A magnetic field exerts no force on _____
   **a) stationary electric charge**
   b) a magnet
   c) an electric charge moving perpendicular to its direction
   d) an unmagnetised iron bar
6. Which of the following instruments works by electromagnetic induction?
   **a) dynamo** b) moving coil galvanometer
   c) telephone receiver d) simple motor
7. For making a strong electromagnet the material of the core should be _____
   a) brass b) laminated steel strips
   **c) soft iron** d) steel
8. A magnetic needle is kept in a non-uniform magnetic field. It experiences _____
   **a) a force and a torque** b) a force but not a torque
   c) a torque but not a force d) neither a force nor a torque
9. The most suitable material for making permanent magnets is _____
   a) copper b) aluminium c) iron **d) steel**
10. An electric generator converts
    a) electric generator into mechanical energy
    b) mechanical energy into heat energy
    c) electrical energy into electrical energy
    **d) mechanical energy into electrical energy**

### II. FILL IN THE BLANKS.

1. The SI Unit of magnetic field induction is ____(**Tesla)**
2. Devices which is used to convert high alternating current to low alternating current is ____(**step down transformer)**
3. An electric motor converts **_____**( **electrical energy into mechanical energy)**
4. A device for producing electric current is **____ (AC generator)**
5. The magnetic field inside a ____ is uniform **(magnet)**
6. The laws of induction were given by _____ **(Faraday)**

7. The SI unit of magnetic field strength is ____ **(Tesla)**
8. The strongest natural magnet is _____ **(lodestone magnetite)**
9. An electric bell contains an ___ consisting of coils of insulated wire wound around. iron rods(**electro magnet)**
10. No force acts in a current carrying conductor when it is ____to the magnetic field. **(parallel)**

## III. MATCH THE FOLLOWING.

| | | | |
|---|---|---|---|
| 1. | Magnetic material | - | Iron |
| 2. | Non-magnetic material | - | wood |
| 3. | Current and magnetism | - | Oerested |
| 4. | Electromagnetic induction | - | Faraday |
| 5. | Electric generator | - | Induction |

## IV STATE WHETHER TRUE OR FALSE. IF FALSE CORRECT THE STATEMENT.

1. A generator converts mechanical energy into electrical energy. - **True**
2. Magnetic field lines always repel each other and do not intersect .- **True**
3. Fleming's Left hand rule is also known as Dynamo rule. - **True**
4. The speed of rotation of an electric motor can be increased by decreasing the area of the coil - **False**
   **Correct Statement**: The speed of rotation of an electric motor can be increased by increasing the area of the coil.
5. A transformer can step up direct current .- **False**
   **Correct Statement:** A transformer can step up alternative current.
6. In a step down transformer the number of turns in primary coil is greater than that of the number of turns in the secondary coil. - **True**

## V. ANSWER IN BRIEF.

**1. State Fleming's Left Hand Rule**

Fleming's Left Hand Rule law states that while stretching the three fingers of left hand in perpendicular with each other, if the direction of the current is denoted by middle finger of the left hand and the second finger is for direction of the magnetic field then the thumb of the left hand denotes the direction of the force or movement of the conductor.

**2. Define magnetic flux density.**

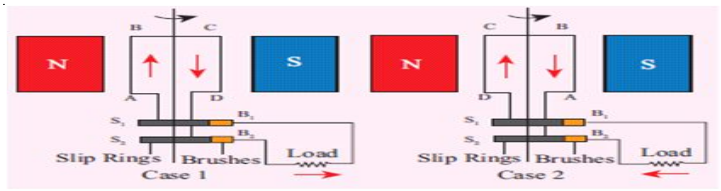
The number of magnetic field lines crossing unit area kept normal to the directin of field lines is called magnetic flux density. Its unit is $Wb/m^2$.

**3. List the main parts of an electric motor**

**Main parts of an electric motor**

* Field magnet * Field magnet * Commutator * Brushes * Coil

**4. Draw and label the diagram of an AC generator**




N, S- permanent magnet
ABCD - Rectangular coil or armature
$S_1$, $S_{2-}$ Slip rings
$B_1$, $B_2$- Carbon brushes

**5. State the advantages of ac over dc.**

* The voltage of ac can be varied easily using a device called transformer.
* The ac can be carried over long distances using step up transformers.
* The ac can be easily converted into dc and generating ac is easier than dc.

**6. Dfferentiate step up and step down transformer**

| S.-NO | STEP UP TRANSFORMER | STEP DOWN TRANSFORMER |
|---|---|---|
| 1 | The transformer used to change a low alternating voltage to a high alternating voltage is called a step up transformer.ie (Vs > Vp) | The transformer used to change a high alternating voltage to a low alternating voltage is called a step down transformer (Vs < Vp). |
| 2 | In a step up transformer, the number of turns in the secondary coil is more than the number of turns in the primary coil (Ns > Np) | In a step down transformer, the number of turns in the secondary coils are less than the number of turns in the primary coil (Ns < Np) |

**7. A portable radio has a built in transformer so that it can work from the mains instead of batteries. Is this a step up or step down transformer? Give reason**

* A step down transformer is used in a portable radio in order to reduce the voltage
* So that rectified DC voltage is equal to battery voltage, hence it can work on mains as well as on battery.

**8. State Faraday's laws of electromagnetic Induction**

(i) Whenever there is a change in the magnetic flux linked with a closed circuit an emf is produced and the amount of emf induced varies directly as the rate at which the flux changes.

* This emf is known as induced emf and the phenomenon of producing an induced emf due to change in the magnetic flux linked with the closed circuit is known as electro magnetic induction.

## VI. ANSWER IN DETAIL.

1. Explain the principle, construction and working of a dc motor

**Principle.**

* An electric motor is a device which converts electrical energy into mechanical energy

**Construction.**

* A simple coil is placed inside two poles of a magnet.The direction of the current is towards B, whereas in the conductor segment CD the direction is opposite.
* As the current is flowing in opposite directions in the segments AB and CD, the direction of the motion of the segments would be in opposite directions according to Fleming's left hand rule.
* When two ends of the coil experience force in opposite direction, they rotate.
* If the current flow is along the line ABCD, then the coil will rotate in clockwise direction first and then in anticlockwise direction.
* If we want to make the coil rotate in any one direction, say clockwise, then the direction of the current should be along ABCD in the first half of the rotation and along DCBA in the second half of the rotation.
* To change the direction of the current, a small device called split ring commutator is used.

**Working.**

* Dc power supply is switched on .
* Current flows into and out of the coil through the carbon brushes.
* Current in the coil produces a magnetic field.
* Magnetic fields due to current and permanent magnets combine to form catapult fields.
* Magnetic forces act on the sides of the coil beside the poles of the magntes.
* Magnetic forces produce turning effect to rotate the coil.

**2. Explain two types of transformer.**

**Transformer**

* Transformer is a device used for converting low voltage into high voltage and high voltage into low voltage.

**Step up transformer**

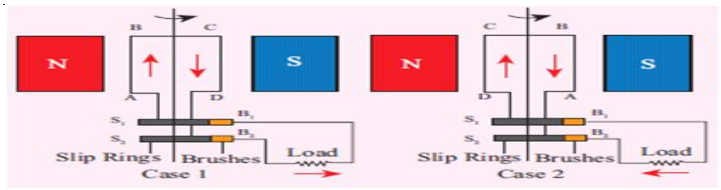
* The transformer used to change a low alternating voltage to a high alternating voltage is called a step up transformer. (Vs > Vp).
* In a step up transformer, the number of turns in the secondary coil is more than the number of turns in the primary coil (Ns > Np)

**Step down transformer:**

* The transformer used to change a high alternating voltage to a low alternating voltage is called a step down transformer (Vs < Vp).
* In a step down transformer, the number of turns in the secondary coils are less than the number of turns in the primary coil (Ns < Np).

**3. Draw a neat diagram of an AC generator and explain its working**

* An alternating current (AC) generator, consists of a rotating rectangular coil ABCD called armature placed between the two poles of a permanent magnet.
* The two ends of this coil are connected to two slip rings S1 and S2. The inner sides of these rings are insulated. Two conducting stationary brushes B1 and B2 are kept separately on the rings S1 and S2 respectively.
* The two rings S1 and S2 are internally attached to an axle. The axle may be mechanically rotated from outside to rotate the coil inside the magnetic field. Outer ends of the two brushes are connected to the external circuit.




* The direction of the induced current, as given by Fleming's Right Hand Rule, is along ABCD in the coil and in the outer circuit it flows from B2 to B1.
* During the second half of rotation, the direction of current is along DCBA in the coil and in the outer circuit it flows from B1 to B2.
* As the rotation of the coil continues, the induced current in the external circuit is changing its direction for every half a rotation of the coil.

## UNIT - 6 LIGHT

### I. CHOOSE THE CORRECT ANSWERS.

1. A ray of light passes from one medium to another medium. Refraction takes place when _____angle of incidence is
   a) $0^0$ **b) $45^0$** c) $90^0$
2. _____ is used as reflectors in torch light.
   **a) Concave mirror** b) Plane mirror c) Convex mirror
3. We can create enlarged, virtual images with
   **a) concave mirror** b) plane mirror c) convex mirror
4. When the reflecting surface is curved outwards the mirror formed will be
   a) concave mirror b) plane mirror **c) convex mirror**
5. When a beam of white light passes through a prism it gets
   a) reflected b) only deviated **c)deviated and dispersed**
6. The speed of light is maximum in
   **a) vacuum** b) glass c) diamond
7. A ray of light as it travels from medium A to medium B refractive index of the medium B relative to medium A is (mB/mA)
   a) $\sqrt{3}/\sqrt{2}$ **b) $\sqrt{2}/\sqrt{3}$** c)$1/\sqrt{2}$ d)$\sqrt{2}$
8. Which of the following has the highest refractive index
   a) air b) water **c) diamond** d) glass
9. The incident ray passing through c of a mirror _____ after reflection
   **a) passes through c** b) passes through f
   c) passes through p d) parallel to the principal axis

10. The image formed by a convex mirror is always
    a) real  b) enlarged  c) virtual and enlarged  **d) diminished**

## II. TRUE OR FALSE . IF FALSE, CORRECT THE STATEMENT .

1. The angle of deviation depends on the refractive index of the glass – **True.**
2. If a ray of light passes obliquely from one medium to another, it does not suffer any deviation – **False.**
   **Correct Statement**: When light travels from one medium to another, it suffers deviation.
3. The convex mirror always produces a virtual, diminished and an erect image of the object – **True**.
4 When an object is at the centre of curvature of concave mirror the image formed will be virtual and erect – **False.**
   **Correct Statement**: The image formed is real, inverted and same size of the object.
5. The reason for brilliance of diamonds is total internal reflection of light – **True.**

## III. FILL IN THE BLANKS.

1. In going from a rarer to denser medium, the ray of light bends ____ (**towards the normal)**
2. The mirror used in search light is ____ **(Concave mirror)**.
3. The angle of deviation of light ray in a prism depends on the angle of _____ **(incidence)**
4. The radius of curvature of a concave mirror whose focal length is 5cm is ___ **(10 cm).**
5. Large ____ mirrors are used to concentrate sunlight to produce heat in solar furnaces.**(concave)**
6. A spherical mirror whose reflecting surface is curved outwards is called ___mirror. **(convex)**
7. The ratio of sine of the angle of incidence to the sine of __ is a constant (**angle of refraction)**
8. All distances parallel to the principal axis are measured from the ____of the mirror. (**pole**)
9. A negative sign in the value of magnification indicates that the image is ___ **(real)**
10. Light is refracted or bent while going from one medium to another because ___ **(speed)** changes

## IV. MATCH THE FOLLOWING.

| | | |
|---|---|---|
| 1. | Ratio of height of image to height of object | - Magnification |
| 2. | Used in hair pin bend in mountains | - Convex mirror |
| 3. | Coin inside water appearing slightly raised | - Refraction |
| 4. | Mirage | - Total internal reflection |
| 5. | Used as Dentist's mirror | - Concave mirror |

## V. ASSERTION AND REASON TYPE QUESTIONS.

**Mark the correct choice as**

**a) If both assertion and reason are true and reason is the correct explanation of assertion.**

b) If both assertion and reason are true and reason is not the correct explanation of assertion.

c) If assertion is true but reason is false

**d) If assertion is false but reason is true**

1. **Assertion:** For observing the traffic at a hairpin bend in mountain paths a plane mirror is preferred over convex mirror and concave mirror.
   **Reason:**A convex mirror has a much larger field of view than a plane mirror or a concave mirror.
   (**d) If assertion is false but reason is true**

2. **Assertion: I**ncident ray is directed towards the centre of curvature of spherical mirror. After reflection it retraces its path.
   **Reason**:Angle of incidence ($i$) = Angle of reflection ($r$) = $0^0$
   **(a) If both assertion and reason are true and reason is the correct explanation of assertion**

## VI. ANSWER VERY BRIEFLY.

1. **According to cartesian sign convention which mirror and which lens has negative focal length?**
   Concave Mirror and Concave Lens

2. **Name the mirror(s) that can give (i) an erect and enlarged image, (ii) same sized, inverted image**
   Concave mirror

3. **If an object is placed at the focus of a concave mirror, where is the image formed?**
   At infinite

4. **Why does a ray of light bend when it travels from one medium to another?**
   A ray of light bends when it travels from one medium to another due to the change in velocity of light in two different medium

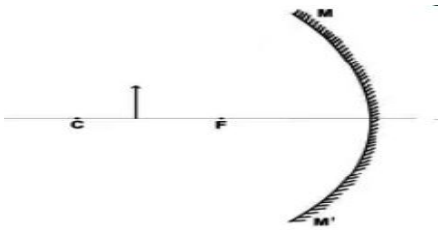
5. **What is the speed of light in Vacuum?**
   The speed of light in vacuum is known to be almost exactly 3,00,000 km per second.

6. **Concave mirrors are used by dentists to examine teeth. Why?**

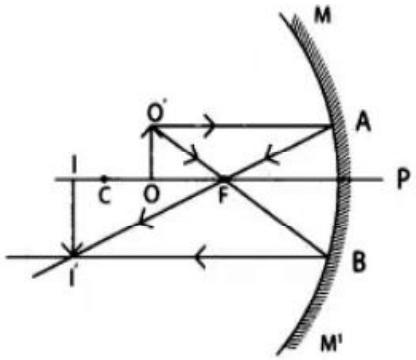
* In dentist's head mirror, a parallel beam of light is made to fall on the concave mirror this mirror focuses the light beam on a small area of the body.Such as teeth, throat etc.

## VII. ANSWER BRIEFLY :-

1. a) Complete the diagram to show how a concave mirror forms the image of the object




(a)




**b) What is the nature of the image?**

Magnified ,real and inverted image

2. **Pick out the concave and convex mirrors from the following and tabulate them:**

**Rear-View mirror, Dentist's mirror, Torch light mirror, mirrors in shopping malls,** make up mirror.

| S.NO | CONCAVE MIRROR | CONVEX MIRROR |
|---|---|---|
| 1) | Dentist's mirror | Rear view mirror |
| 2) | Torch light mirror | Mirrors in shopping mall |
| 3) | Make up mirror | |

3. **State the direction of incident ray when after reflection from a spherical mirror retraces its path. Give reason for your answer.**

When Incident ray is directed towards the centre of curvature, at all the points of spherical miorror, the ray is always normal.

Therefore, angle of incidence <i = angle of reflection <r = 0

4. **What is meant by magnification? Write its expression. What is its sign for real image and virtual image?**

Magnification is the increase in size of an image compared to true size

Magnification m = height of the image / height of the object

**Real image** **- Negative sign**

**Virtual image** **- Positive sign**

5. **Write the spherical mirror formula and explain the meaning of each symbol used in it**

**Mirror Formula**:

$$\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$$

Here **f=** focal length of a spherical mirror

**u=** distance of the object.

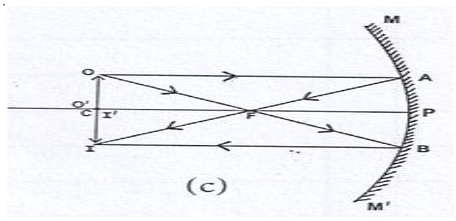
**v=** distance of the image.

## VIII. ANSWER IN DETAIL.

1. **a) Draw ray diagram to show how the image is formed using a concave mirror, when the position of object is (i) at C (ii) between C and F (iii) between F and P of the mirror.**

**b)Mention the position and nature of image in each case**

**(i) Object at C (When the object is at the centre of curvature)**

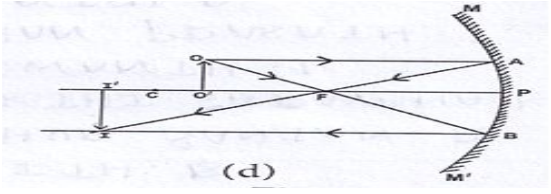


(c)

**Position of the image**: The image is at the centre of curvature itself.

**Nature of the image** : It is real, Inverted and same size as the object

**(ii) Object between C and F (When the object is in between the centre of curvature C and principal focus F)**

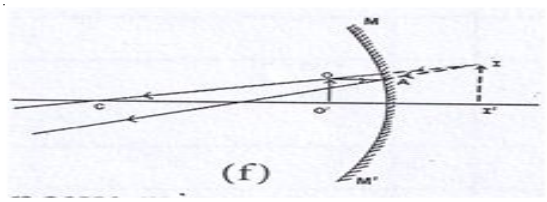


(d)

**Position of the image** : The image is beyond C

**Nature of the image:** It is real inverted and magnified

**(iii) <u>Object between F and P of the mirror</u> ( When the object is in between the focus and the pole P)**

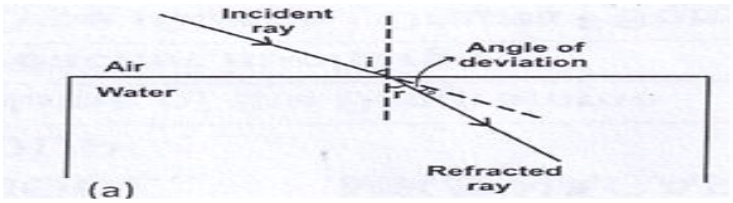



**Position of the image** : The image is behind the mirror
**Nature of the image** It is Virtual, Erect and Magnified

**2. Explain with diagrams how refraction of incident light takes place from a) rarer to denser medium b) denser to rarer medium c) normal to the surface separating the two media.**

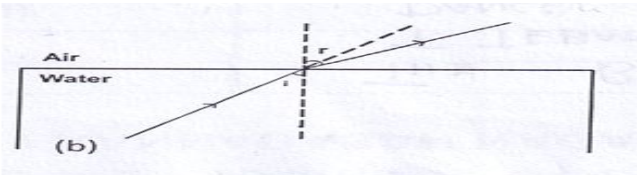
**a) <u>rarer to denser medium</u>**

When a ray of light travels from optically rarer medium to optically denser medium it bends towards the normal.



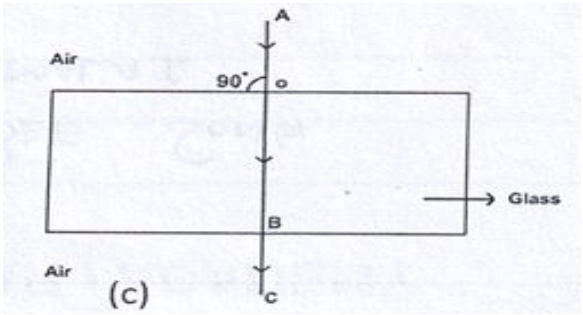

**b) <u>denser to rarer medium</u>**

When a ray of light travels from an optically denser medium to an optically rarer medium it bends away from the normal



**c) <u>Normal to the surface separating the two media</u>**

A ray of light incident normally on a denser medium goes without any deviation




## IX. NUMERICAL PROBLEMS:-

**1. A concave mirror produces three times magnified real image of an object placed at 7cm in front of it. Where is the image located?**

Here given magnification m = 3

Object distance u = - 7cm

Magnification m = - v /u

3 = - v/u

3u = - v

- v = 3u = 3 x -7 = -21cm

**v = 21 cm**

**Hence, Real, inverted and magnified image will be formed at 21 cm in front of the mirror.**

**2. Light enters from air into a glass plate having refractive index 1.5. What is the speed of light in glass?**

Refractive index of a glass plate μ= 1.5

Speed of light in Vacuum in c =3 x$10^8$ $ms^{-1}$

Speed of light in glass v =?

$$\mu = \frac{c}{v} = \frac{\text{speed of light in vacuum}}{\text{speed of light in medium}}$$

$$1.5 = \frac{3 \times 10^8}{v}$$

$$v = \frac{3 \times 10^8}{1.5} = 2 \times 10^8 \ ms^{-1}$$

**Speed of light in glass = 2 x $10^8$ $ms^{-1}$**

**3 The speed of light in water is 2.25 x 10 $ms^{-1}$.If the speed of light in vacuum is 3 x $10^8$ms-1. Calculate the refractive index of water**

Speed of light in water v = 2.25 x 10 $ms^{-1}$

Speed of light in Vacuum c= 3 x 10 $ms^{-1}$

Refractive index of water μ = ?

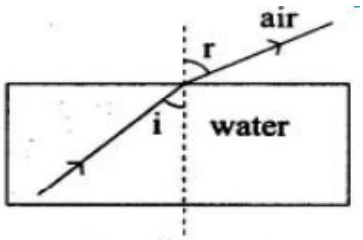
$$\mu = \frac{c}{v}$$

$\mu = 3 \times 10^8 / 2.25 \times 10^8$

**$\mu = 1.33$**

## X. HIGHER ORDER THINKING SKILLS.

1. **Light ray emerges from water into air. Draw a ray diagram indicating the change its path in water.**



Ray diagram

2. **When a ray of light passes from air into glass is the angle of refraction greater than or less than the angle of incidence?**

* Light bends towards the normal because glass is denser than air.
* It bends towards normal. Since light has to travel with lesser speed in glass but within short time.
* $\angle r < \angle i$. Angle of refraction is less than the angle of incidence.

3. **What do you conclude about the speed of light in diamond if the refractive index of diamond is 2.41?**

$\mu = 2.41$; $Ca = 3 \times 10^8$ ms [Velocity of light]

$$\mu = \frac{\text{Speed of light in air}}{\text{Speed of light in diamond } C_d} = C_a$$

$$C_d = \frac{C_a}{\mu} = \frac{3\times10^8}{2.41} = 1.245 \times 10^8 \text{ m/s}$$

**Speed of light decreases when the light ray travels from air to diamond.**

# UNIT-7 HEAT

## I. CHOOSE THE CORRECT ANSWER.

1. Calorie is the unit of _____
   **a) heat** b)work c) temperature d) food
2. SI unit of temperature is _____
   a) fahrenheit b) joule c) celsius **d) kelvin**
3. Two cylindrical rods of same length have the area of cross section in the ratio 2:1. If both the _____rods are made up of same material, which of them conduct heat faster?
   a) Both rods b) Rod-2 **c) Rod-1** d) None of them

4. In which mode of transfer of heat, molecules pass on heat energy to neighbouring molecules without actually moving from their positions?
   **a)** Radiation b) **Conduction** c) Convection d) Both B and C
5. A device in which the loss of heat due to conduction, convection and radiation is minimized is _____
   a) solar cell b) solar cooker c) thermometer **d) thermos flask**
6. Sweating causes cooling because water has a _____
   a) high specific heat b) low specific heat
   c) high latent heat of fusion **d) high latent heat of vaporisation**
7. Which one of the following scales has lower fixed point at $0^0$ C ?
   a) Kelvin scale b) Farenheit scale
   **c) Celsius Scale** d) All of these
8. Warm air is _____
   **a) lighter than cold air** b) heavier than cold air
   c)both have equalweights d)cannot be said.
9. The Phenomenon involved in sea breeze and land breeze is _____
   **a) Convection** b) Conduction c) radiation d) none of these
10. The specific heat capacity if water is _____
    **a) 4200 J $kg^{-1}k^{-1}$** b) 420 $Jg^{-1}k^{-1}$ c) 0.42 $Jg^{-1}k^{-1}$ d) 4.2$kg^{-1}k^{-1}$

## II FILL IN THE BLANKS.

1. The fastest mode of heat transfer is ____ **(radiation)**
2. During day time, air blows from ___ to ___ **(sea, land )**
3. Liquids and gases are generally _____ conductors of heat. **(poor)**
4. The fixed temperature at which matter changes state from solid to liquid is called _____**(melting point)**
5. ___scale is known as absolute scale.**(Kelvin)**
6. _____ is a process which is just reverse melting.**(Freezing)**
7. Radiation cosists of ___ waves travelling at the speed of light. **(Electromagnetic)**
8. We can observe all the three ways of heat transfer while _____ **(Burning wood)**
9. Specific latent heat L= ___ **(Q/M).**
10. The sum of the kinetic and potential energy is called the _____of the molecules.**(internal energy)**

## III ASSERTION AND REASON TYPE QUESTIONS.

**Mark the correct choice as:**

a. If both assertion and reason are true and reason is the correct explanation of assertion.
b. If both assertion and reason are true and reason is not the correct explanation of assertion.
c. If assertion is true but reason is false
d. If assertion is false but reason is true

1. **Assertion**:Food can be cooked faster in vessels with copper bottom.
   **Reason**:Copper is the best conductor of heat.

**(a) If both assertion and reason are true and reason is the correct explanation of assertion**.

2. **Assertion**: Maximum sunlight reaches earth's surface during the noon time.
   **Reason**: Heat from the sun reaches earth's surface by radiation.
   **(b) If both assertion and reason are true and reason is not the correct explanation of assertion.**
3. **Assertion**: When water is heated upto 100·C, there is no raise in temperature until all water gets converted into water vapour.
   **Reason**:Boiling point water is 10 ºC
   **(c) If assertion is true but reason is false.**

## IV ANSWER THE FOLLOWING.

**1. Define Conduction.**

The process of transfer of heat in solids from a region of higher temperature to a region of lower temperature without actual movement of molecules is called conduction.

**2. Ice is kept in a double -walled container. Why ?**

Ice is kept in a double walled container so as to prevent melting of ice from the heat absorbed present in immediately surrounding.

**3. How does the water kept in an earthern pot remain cool ?**

The water kept in an earthern pot remains cool even in summer because of evaporation. Earthen pot has a large number of tiny pores in its wall and some of the water molecules continuously keep seeping through these pures to outside pot. This water evaporates continously and takes the latent heat required for vaporization from the remaining water. In this way, the remaining water loses heat and gets cooked.

**4. Differentiate convection and radiation.**

| S.No | CONVECTION | RADIATION |
|---|---|---|
| 1. | Flow of heat through a fluid from places of higher temperature to places of lower temperature by movement of the fluid itself | Flow of heat from one place to another by means of electromagnetic waves. |
| 2. | Convection needs matter to be present | Radiation can occur even in vacuum |
| 3. | Convection seen in daily life:<br>Hot air balloons, breeze, wind, chimney | Radiation in daily life:<br>White or light coloured cloths, highly polished surface of airplane, helps to reflect most of the heat radiation from the sun |

**5. Why do people prefer wearing white clothes during summer ?**

People prefer white or light coloured clothes during summer as they are good reflectors of heat and hence they keep us cool.

**6. What is specific heat capacity ?**

Specific heat capacity of a substance is defined as the amount of heat required to raise the temperature of 1 kg of the substance by $1^0$C or !k.

The SI unit of specific heat capacity is $Jkg^{-1}\ K^{-1}$

**7. Define thermal capacity ?**

Thermal Capacity or heat capacity is defined as the amount of heat energy required to raise the temperature of a body by $1^0$C. It is denoted by C'.

**8. Define Specific latent heat capacity ?**

Specific latent heat is the amount of heat energy absorbed or liberated by unit mass of a substance during change of state without causing any change in temperature.

The SI unit of specific latent heat is J/kg.

## V ANSWER IN A PARAGRAPH.

**1. Explain convection in daily life.**

* **Hot air balloons**

Air molecules at the bottom of the balloon get heated by a heat source and rise. As the warm air rise, cold air is pushed downward and it is also heated.When the hot air is trapped inside the balloon, it rises.

* **Breeze.**

During day time, the air in contact with the land becomes hot and rises.Now the cool air over the surface of the sea replaces it.It is called sea breeze.During night time, air above the sea is warmer.

As the warmer air over the surface of the sea rises, cooler air above the land moves towards the sea. It is called land breeze.

* **Winds.**

Air flows from area of high pressure to area of low pressure.

The warm air molecules over hot surface rise and create low pressure. So, cooler air with high pressure flows towards low pressure area. This causes wind flow.

* **Chimneys.**

Tall chimneys are kept in kitchen and industrial furnaces.As the hot gases and smoke are lighter, they rise up in the atmosphere.

**2. What are the changes of state in water ? Explain.**

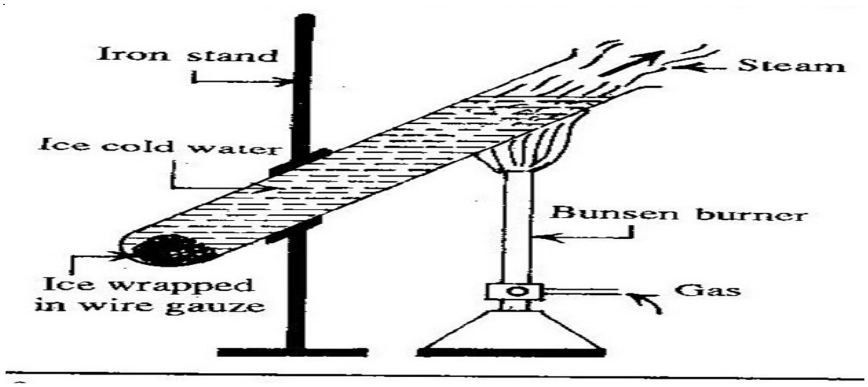
* The process of changing of a substance from one physical state to another at a definite temperature is known as change of state.
* When water is heated to $100^0$C, it becomes steam which is a gaseous state of matter.On reducing the temperature of the steam it becomes water again.
* If we reduce the temperature further to $0^0$C, It becomes ice which is a solid state of water.Ice on heating, becomes water again.
* Thus water changes its state when there is a change in temperature.
* The process in which a solid is converted to liquid by absorbing heat is called **melting or fusion.**

* The process in which a liquid is converted to solid by releasing heat is called **freezing.**
* The process in which a liquid is converted to vapour by absorbing heat is called **boiling or vaporization.**
* The process in which a vapour is converted to liquid by releasing heat is called **condensation.**
* The process in which a solid is converted to gaseous state is called **sublimation**.

**3. How can you experimentally prove water is a bad conductor of heat ? How is it possible to heat water easily while cooking ?**

**Experiment to prove that water is a bad conductor of heat:**

Take hard glass tube and drop in it a tiny cube of ice , wrapped in a gauze. Fill 3/4 of the tube with ice cold water and then set up the apparatus as shown in the diagram. Heat the test tube near its mouth. It is observed that in few moments water starts boiling near the top, but the ice at the bottom does not melt. This experiment shows that water is a bad conductor of heat.




This proves that water is a bad conductor of heat.

It is easy to heat water easily or quickly while cooking.This is because, while cooking the vessel or pan is usually covered with a lid.

This leads to three things;

* Radiation from the hot water is reflected back into the pan rather than being emitted
* Free convection is effectively eliminated, and evaporative cooling is also eliminated.
* This in turn allows the water to be heated more easily.

## VI NUMERICAL PROBLEMS.

**1. What is the heat in joules required to raise the temperature of 25 grams of water from 0·C to 100·C ? What is the heat in calories?**

| | | | |
|---|---|---|---|
| Given mass of water, | m | = | 25 g |
| Initial temperature | $T_1$ | = | 0°C |
| Final temperature | $T_2$ | = | 100°C |
| change in temperature = | $T = T_2 - T_1$ | = | (100-0)°C |
| | $\triangle T$ | = | 100°C |
| | C | = | 4.18J/g°C |

Heat required (in joules) Q = m × C × △T = 25 × 4.18 × 100 = 10450 J

**Heat required (in calories)**

| | |
|---|---|
| 1 calorie | = 4.18 J |
| 10450 J | = 10450 /4.18 |
| | =2496 calories |

**2. What could be the final temperature of a mixture of 100 g of water at 90°C and 600g of water at 20°C.**

To find final temperature: △Q = mc

100g of water originally at 90°C will loose an amount of heat,

△Q= mc rT

△Q =100 × c × (90 – T)

The same amount of heat will be absorbed by 600g of water originally at 20°C to raise itstemperature to T.

| | |
|---|---|
| △Q | = 600 × c × (T – 30) |
| 600C (T – 20°) | = 100C (90° – T) |
| 6T – 120° | = 90° – T |
| 6T + T | = 120° + 90° |
| 7T | =210° T = 210/7 |
| T | = 30°C |

**3. How much heat energy is required to change 2 kg of ice at 0°C into water at 20°C?**

**(Specific latent heat of fusion of water = 3,34,000J/kg,Specific heat capacity of**

**water = 4200Jkg$^{-1}$ K$^{-1}$)**

| | | |
|---|---|---|
| Given Mass of ice | m | = 2kg |
| Specific latent heat of fusion of water | | = 3,34,000J/kg |
| | △T | = ( $T_f$ - $T_i$) |
| | △T | =(20-0)°C= 20°C |
| Specific heat capacity of water | | = 4200Jkg $^{-1}$ K $^{-1}$ |
| Heat energy is required , | Q | = (m xc x△T)+(m x L) |
| | | = (2x4200x20)+(2x3,34,000) |
| | | = (8400x20)+ (6,68,000) |
| **Heat energy is required , Q** | | **= 8,36,000 J** |

## UNIT - 8 SOUND

### I CHOOSE THE CORRECT ANSWER

1. Which of the following vibrates when a musical note is produced by the cymbals in a orchestra?
   a) stretched strings b) stretched membranes
   c) air column **d) metal plates**
2. Sound travels in air:
   a) if there is no moisture in the atmosphere
   b) if particles of medium travel one place to another
   c) if both particles as well as disturbance move from one place to another
   **d) if disturbance moves**
3. A musical instrument is producing continuous note. This note cannot be heard by a person having a normal hearing range. This note must then be passing through
   a) wax **b) vaccum** c) water d) empty vessel
4. The maximum speed of vibrations which produces audible sound will be in
   a) sea water **b) ground glass** c) dry air d) human blood
5. The sound waves travel faster
   a) in liquids b) in gases **c) in solids** d) in vaccum
6. The frequency greater than 20000 Hz is _____ sound.
   a) Infrasonic **b) ultrasonic** c) audible d) sonic
7. Sound cannot travel through _____
   a) darkness b) gases **c)vaccum** d) all of these
8. Sound travels in air as _____ wave .
   **a) longitudinal** b) transverse c) electromagnetic d) all of these
9. When temperature increases the speed of sound _____.
   **a) increases** b) decreases c) remains same d) none of these
10. The relation between speed, frequency and wavelength is _____
    a) $v=u/\lambda$ b) $v= \lambda/\Upsilon$ **c) $v = \Upsilon/\lambda$** d) $v = 1/ \lambda$

### II FILL IN THE BLANKS.

1. Sound is a ____wave needs a material medium to travel.**(longtitudinal)**
2. Number of vibrations produced in one second is _____**.(frequency)**
3. The velocity of sound in solid is ____ than the velocity of sound in air.**(greater)**
4. Vibration of object produces ____ **(sound).**
5. Loudness is proportional to the square of the ____ **(Amplitude).**
6. ___ is a medical instrument used for listening to sounds produced in the body.**(Stethoscope)**
7. The repeated reflection that results in persistance of sound is called ____ **(reverberation).**
8. The loudness of sound depends on the ___ of the sound wave. **(intensity)**
9. The part of ear that collects the sound from the surroundings is ___ **(pinna).**
10. _____ is an image obtained by the use of reflected ultrasonic waves.**(An echogram)**

## III MATCH THE FOLLOWING.

| | | | |
|---|---|---|---|
| 1. | Tuning fork | - | production of sound |
| 2. | Sound | - | longitudinal wave |
| 3. | Compressions | - | the point where density of air is maximum |
| 4. | Amplitude | - | Maximum displacement from the equilibrium position. |
| 5. | Ultrasonics | - | The sound whose frequency is greater than 20,000 **Hz.** |

## IV ANSWER IN BRIEF .

**1. Through which medium sound travels faster, iron or water ? Give reason.**

Sound travels faster through iron as solids are packed together tighter than liquids and gases.

**2. Name the physical quantity whose S.I unit is 'Hertz' Define.**

* The SI unit of frequency is hertz.(Hz).
* The number of vibrations produced in one second is called frequency of the wave.

**3. What is meant by supersonic speed ?**

When the speed of any object exceeds the speed of sound in air, it is said to be travelling at supersonic speed.

Eg Bullets, jets

**4. How does the sound produced by a vibrating object in a medium reach your ears?**

* All sounds are produced by vibrations of substances.
* These vibrations travel as disturbances in a medium and reach our ears as sound.
* Thus this process continues in the medium till the sound reaches our ear.

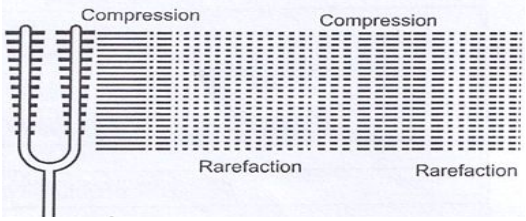
**5. You and your friend are on the moon. Will you be able to hear and sound produced by your friend ?**

No, as there is no medium on moon for the sound to travel..

## V. ANSWER IN DETAIL.

1. Describe with diagram how compressions and rarefactions are produced.

* The waves that propagates with compressions and rarefactions are called longitudinal waves.
* In longitudinal waves the particles of the medium move to and fro along the direction of propagation of the wave.Sound also is a longitudinal wave.




* Compressions are the regions where particles are crowded together.

* Rarefactions are the regions of low pressure where particles are spread apart.

**2. Verfity experimentally the laws of reflection of sound.**

* Make two identical long pipes using chart paper.
* Arrange them on a table near wall.
* Keep a clock near the open end of one pipe hear the sound of the clock through the other pipe.
* Adjust the pipe till the sound of the clock is heard with more clarity
* Now measure the angle of incidence and reflection and see the relationship between the angles.
* The angle in which the sound is incident is equal to the angle in which sound is reflected.
* Direction of incident sound, direction of the reflected and the normal are in the same plane. Thus laws of reflection of sound are verified.

**3. List the applications of Ultrasonic sound.**

Applications of Ultrasonic sound

* **Cleaning Technology**

  Minute foreign particles can be removed from objects placed in a liquid bath by ultrasonic sound waves.
* **Industry-** To detect cracksd and flaws in metal blocks.
* **Medicine**

  **Echo cardiography**

  Ultrasonic waves are made to reflect from various parts of the heart and form the image of the heart.

  **In kidney**

  To break small stones formed in the kidney into fine grains, which is flushed out with urine.

**4. Explain how does SONAR work ?**

SONAR is the abbreviation for **Sound Navigation and Ranging**.

* S0NAR consists of a transmitter and a detector and are installed at the bottom of boats and ships.
* The Transmitter produces and transmits the ultrasonic waver to travel through water.
* The detector senses the ultrasonic waves that reflected back after striking the object.
* It converts ultrasonic waves into electrical signal which can be interpreted.
* By knowing the speed of sound in water (u) and time interval (t) between transmission and reception of ultrasonic sound , the distance of the object can be calculated by, 2d = u x t. this method is called echo- ranging.

## VI NUMERICAL PROBLEMS.

**1. The frequency of a source of sound is 600 HZ. Calculate the number of times vibrates in a minute ?**

Given : Frequency n = 600 Hz

Frequency = numberof vibrations in a second

Frequency in a minute = Frequency in a second x 60

= 600 x 60 = 36,000

No. of vibrations in a minute = **36, 000 Hz or 36 KHz**

**2. A stone is dropped from the top of a tower 750 m high into a pond of water at the base of the tower. Calculate the number of seconds for the splash to be heard ? ( Given g=10ms$^{-2}$ and speed of sound = 340 ms $^{-1}$)**

Given Height of the tower s = 750m

g = 10 ms$^{-2}$

v = 340 ms$^{-1}$

The initial velocity is of stone, u = 0

consider

(i) Time taken to reach the pond $\mathbf{t_1}$

(ii) Time taken by the sound to reach top $\mathbf{t_2}$

According to Equation of motion s $= ut + \frac{1}{2} at^2$

here s $= ut_1 + 1/2\ gt_1^2$

750 $= 0xt_1 + 1/2x\ 10 \times gt_1^2$

750 $= 0 + 5t_1^2$

$5t_1^2 = 750$

$t_1^2 = \frac{750}{5}$

$t_1^2 = 150$

$t_1 = \sqrt{150}$

$\mathbf{t_1}$ **= 12.25 s**

(ii) Time taken by the sound to reach top $t_2$ = s/v

$= \frac{750}{340}$

$= \frac{75}{34}$

= 2.2 s

Total time for splash to be heard at top $t = t_1 + t_2$

s=12.25+2.2 = 14.45 s

## UNIT - 9 UNIVERSE

### I. CHOOSE THE CORRECT ANSWER.

1. Who proposed the heliocentric model of the universe?
   a) Tycho Brahe **b) Nicolaus Copernicus**
   c) Ptolemy d) Archimedes
2. Which of the following is not a part of outer solar system?
   **a) Mercury** b) Saturn c) Uranus d) Neptune
3. Ceres is a _____
   a) Meteor b) Star c) Planet **d) Astroid**
4. The period of revolution of planet A around the Sun is 8 times that of palnet B. How many time is the distance of planet A as great as that of planet B?
   **a) 4** b) 5 c) 2 d) 3

5. The Big Bang occured _____ years ago.
   **a) 13.7 billion** b) 15 million c) 15 billion d)20 million
6. The process that takes place in the Sun is _____
   a) Nuclear Fission b) Spallation
   **c) Nuclear Fusion** d) None of these
7. The Geocentric model of universe was proposed by _____
   a) Tyago Brane b) Kepler **c) Ptolemy** d) Copernics
8. Hottest planet on the solar system is _____
   **a) Venus** b) Mercury c) Mars d) Earth
9. Stars are built by _____ gases.
   **a) Hydrogen** b) Helium c) Nitrogen d) Oxygen
10. The first part of the Iss was launched by _____
    a) Russian soyuz **b) Russian Zarya**
    c) Russian Orbital d) American Sputnik

## II FILL IN THE BLANKS.

1. The speed of sun in km/s is ____ **(250km/s**)
2. The rotational period of the sun near its poles is ___ **(36 days).**
3. India's first satellite is ____ **(Aryabhata)**
4. The third law of Kepler is also know as the law of _____(**Harmonies**).
5. The number of planets in our solar system is ___ **(8)**
6. The biggest asteroid is ____**(Ceres).**
7. Sun is the star present in the galaxy called ____ **(Milky Way)**.
8. The Greek name for the Sun is ___ **(Helios).**
9. ___ is the only moon in the solar system with clouds.(**Titan)**
10. The temperature of the star is determined by ___ **(colour)**

## III STATE WHETHER TRUE OR FALSE. IF FALSE, CORRECT THE STATEMENT:

1. ISS is a proof for international cooperation.**True**
2. Halley's comet appears after nearly 67 hours.**False**
   **Correct statement** :Halley's comet appears after nearly 76 years.
3. Satellites nearer to the Earth should have lesser orbital velocity.**False**
   **Correct statement:** Satellites nearer to the earth should have higher orbtial velocity.
4. Mars is called the red planet.**True**

## IV ANSWER BRIEFLY.

**1. What is Solar system ?**

* The Sun and celestial bodies which revolve around it form the solar system.
* It consists of larger number of bodies such as planets, Comets , asteroids and meteors.

**2. Define Orbital velocity.**

The horizontal velocity that has to be imparted to a satellite at the determined height so that it makes a circular orbit around the planet is called Orbital velocity.

**3. Define Time Period of a satellite .**

Time taken by the satellite to complete one revolution around the earth is called time period of satellite.

Time Period , T = $\frac{\text{Distance covered}}{\text{Orbital velocity}}$

$T = 2 \Pi r/v$

**4. What is a Satellite ? What are the two types of satellites ?**

A body moving in an orbit around a planet is called satellite.The two types of satellites are :* Natural Satellites * Artificial Satellites

**5. Write a note on the inner planets.**

* The four planets grouped together in the inner solar system are Mercury, Venus, Earth and Mars. They are called inner planets.
* They have a surface of solid rock crust and so are called terrestrial or rocky planets.

**6. Write about comets .**

* Comets are lumps of dust and ice that revolve around the Sun in highly elliptical orbits.
* Their period of revolution is very long. When approaching the Sun, a comet vaporizes and forms a head and tail.
* Some of the biggest comets even seen had tails 160 million (16 crores) km long. Many comets are known to appear periodically.
* One such comet is Halley's Comet, which appears after nearly every 76 years. It was last seen in 1986. It will next be seen in 2062.

**7. State Kepler's Laws.**

* **First Law**: All planets revolve around the Sun in elliptical orbits with Sun at one of their foci.
* **Second Law**:The line connecting the planet and the Sun covers equal areas in equal intervals of time.
* **Third Law**: The square of time period of revolution of a planet around the Sun is directly proportional to the cube of the distance between sun and the planets.

**8. What factore have made life on earth possible ?**

**Factor responsible for life on earth.**

* Right distance from the Sun
* Presence of water.
* Blanket of ozone.
* Right temperature.
* Suitable atmosphere

## V ANSWER IN DETAIL.

**1. Give an account of all the planets in the solar system.**

**Mercury**

* Mercury is a rocky planet nearest to the Sun.
* It is very hot during day but very cold at night.

**Venus.**

* Venus is a special planet from the Sun,almost the same size as the Earth.
* It is the hottest planet in our solar system.

**The Earth.**

* The Earth where we live is the only planet in the solar system which supports life.
* Due to its right distance from the Sun it has the right temperature, the presence of water and suitable atmosphere and a blanket of ozone.
* All these have made continuation of life possible onthe Earth.

**Mars**

* The first planet outside the orbit of theEarth is Mars.
* It appears slightly reddish and therefore it is also called the red planet.

**Jupiter**

* Jupiter is called as Giant planet.
* It is the largest of all planets. It has has 3 rings and 65 moons.

**Saturn**

* It is known for its bright shiny rings, Saturn appears yellowish in colour.
* It is the second biggest and a giant gas planet in the outer solar system.

**Uranus**

* Uranus is a cold gas giant and it can be seen only with the help of large telescope.
* Due to its peculiar tilt, it has the longest summers and winters each lasting 42 years.

**Neptune:**

* It appears as Greenish star.
* It is the eighth planet from the Sun and is the windiest planet.

**2. Discuss the benefits of ISS**

* **Water purification efforts**.

  The water recovery system (WRS) and the oxygen generation system (OGS) techniques developed by ISS provides advanced water filteration and purification to waterscarcity.

* **Eye tracking technology.**

  Eye tracking technology is helping disabled people with limited movement and speech.

  For example, a kid who has severe disability in body movements can use his eye-movements alone and do routine tasks and lead an independent life

* **Robotic arms and surgeries.**

  Robotic arms developed for research in the ISS are providing significant help to the surgeons in removing inoperable tumours (e.g., brain tumours) and taking biopsies with great accuracies

**3. Write a note on orbital velocity.**

The horizontal velocity that has to be imparted to a satellite at the determined height so that it makes a circular orbit around the planet is called orbital velocity.

The orbital velocity of the satellite depends on its altitude above Earth. Nearer the object to the Earth, the faster is the required orbital velocity.

At an altitude of 200 kilometres, the required orbital velocity is little more than 27,400 kph. That orbital speed and distance permit the satellite to make one revolution in 24 hours. Since Earth also rotates once in 24 hours, a satellite stays in a fixed position relative to a point on Earth's surface.

Because the satellite stays over the same spot all the time, this kind of orbit is called 'geostationary'.

Orbital velocity can be calculated using the following formula.

$v = \sqrt{\frac{GM}{(R+h)}}$

where; G = Gravitational constant ($6.673 \times 10^{-11} Nm^2kg^{-2}$)

M = Mass of the Earth ($5.972 \times 10^{24}$kg)

R = Radius of the Earth (6371 km)

h = Height of the satellite from the surface of the Earth.

## VI. Conceptual questions.

**1. Why do some stars appear blue and some red ?**

* Stars appear blue and red because of difference in there temperature.
* The star which is hot have red colour, the star which is hotter have blue colour and the star which is hottest have white colour.

**2. How is a satellite maintained in nearly circular orbit ?**

* Artificial satellites are made to revolve in an orbit at a height of few hundred kilometres.
* At this altitude, the friction due to air is negligible.
* The satellite is carried by a rocket to the desired height and released horizontally with a high velocity, so that it remains moving in a nearly circular orbit.

**3. Why are some satellites called geostationary ?**

Since Earth also rotates once in 24 hours, a satellite stays in a fixed position relative to a point on Earth's surface.

Because the satellite stays over the same spot all the time, this kind of orbit is called 'geostationary'.

**4. A man weighing 60 kg in the earth will weight 1680 kg in the sun. Why?**

**Mass of the man = 60Kg**

$w = m \times g$

$m = 60Kg, g = 274.13 m/s^2$

The sun's gravtitational acceleration is 30 times more than that of the earth. So the person would weigh 16,447N on the surface of sun.

## VII. NUMERICAL PROBLEMS.

**1. Calculate the speed with which a satellite moves if it is at a height of 36,000 km from the earth's surface and has an orbital periods of 24hr**

**(Take R = 6370 km)[ Hint : convert hr into seconds before doing calculation]**

| | |
|---|---|
| T | = 2P (R+h)/v |
| 86400 | = 2 × 3.14 × (6370 + 36000)/v |
| v | = 6.28 × 42370 |
| | = 266083.6 km/sec |
| s | = d/t = 266083/24 |
| | = 11086.79 km/h |

**2. At an orbital height of 400 km,. find the orbital period of the satellite**.

h = $400 \times 10^3$ m,

= $6371 \times 10^3$ m,

v = $7616 \times 10^3$ $kms^{-1.}$

(Substituting the values,)

T = $2P\ (R+h)/v$

$T = 6.28 \times \frac{6771}{7616}$

$T = 5.583 \times 10^3 s = 5583$ .

**T =93 min**

## UNIT 10 MATTER AROUND US

### I. CHOOSE THE CORRECT ANSWER.

1. The separation of denser particles from lighter particles done by rotation at high speed is called_____
   a) filtration b) sedimentation c) decantation **d) centrifugation**
2. Among the following _____ is the mixture
   a) Common salt **b) Juice** c) Carbon dioxide d) Pure silver
3. When we mix a drop of ink in water we get a _____
   a) Heterogeneous Mixture b) Compound
   **c) Homogeneous Mixture** d) Suspension
4. _____ is essential to perform separation by solvent extraction method.
   **a) separating funnel** b) filter paper c) centrifuge machine d) sieve
5. _____ has the same properties throughout the sample.
   **a) Pure substance** b) Mixture c) Colloid d) Suspension
6. Muddy water is an example of _____
   a) True solution **b) Suspension** c) Colloidal solution d) No solution
7. Which of the following will show the “Tyndall effect?
   a) Salt solution **b) Milk and starch solution**
   c) Copper sulphate d) Sugar solution
8. The physical state of water at 373 k is _____
   a) Solid b) liquid **c) Vapour** d) Plasma
9. Gases change to liquid by the process of _____
   a) Melting b) Vapourising **c) Condensing** d) Freezing
10. Inter molecular space is maximum in _____
    a) Solids b) liquids **c) gases** d) all the above

### II. STATE WHETHER TRUE OR FALSE.IF FALSE CORRECT THE STATEMENT.

1. Oil and water are immiscible in each other. - **True**
2. A compound cannot be broken into simpler substances chemically .- **False**
   **Correct statement** : A compound can be broken into simpler substances chemically.
3. Liquid - liquid colloids are called gel. - **False**
   **Correct statment :** Liquid - liquid colloids are called emulsion.

4. Buttermilk is an example of heterogenous mixture - **True**
5. Aspirin is composed of 60% Carbon, 4.5% Hydrogen and 35.5% Oxygen by mass. Asprin is a mixture -**False**
   **Correct statement :**Aspirin is composed of 60% Carbon, 4.5% Hydrogen and 35.5% Oxygen by mass. Aspirin is a compound.

## III. MATCH THE FOLLOWING.

| | | | |
|---|---|---|---|
| 1. | Element | - | Pure substance |
| 2. | Compound | - | Made up of atoms |
| 3. | Colloid | - | Made up of molecules |
| 4. | Suspension | - | Settles down on standing |
| 5. | Mixture | - | Impure substance |

## IV. FILL IN THE BLANKS .

1. A _____ mixture has no distinguishable boundary between its components.**(Homogeneous)**
2. An example of a substance that sublimes is ____ **(Camphor)**
3. Alcohol can be separated from water by _____ **(fractional distillation**)
4. In petroleum refining, the method of separation used is ____**(fractional distillation)**.
5. Chromatography is based on the principle of ____ **(different solubilities ).** in the same solvent.
6. Expand the LPG ____ **(Liquid petroleum gas)**.
7. ____ is the SI unit of temperature.**(Kelvin)**
8. Examples of foam is ____ **(soap lather)**
9. Inverse of sublimation is called ____**(deposition)**
10. Gas-solid is ____ **(solid foam)**.

## V. ANSWER VERY BRIEFLY.

**1. Differentiate between absorption and adsorption**

| Absorption | Adsorption |
|---|---|
| It is the process by which the substance is uniformly distributed throughout the bulk of another substance. | It is the process in which the particles of a substance is concentrated only at the surface of another substance. |

**2. Define Sublimation**

* Certain solid substances when heated change directly from solid to gaseous state without attaining liquid state.
* The vapours when cooled give back the solid substance.
* This process is known as sublimation. Example camphor.

**3. A few drops of "Dettol" when added to water the mixture turns turbid. Why?**
A few drops of **"dettol"** when added to water the mixture turns turbid,

because an emulsion is a colloid of two or more immiscible liquids where one liquid (dettol) is dispersed in another liquid (water).

**4. Name the apparatus that you will use to seperate the components of mixtures containing two (i) miscible liquids, (ii) Immiscible liquids**

* Miscible liquids- Fractional distillation flask, fractionating column.
* Immiscible liquid- Separating funnel.

**5. Name the components in each of the following mixtures**

**(i) Ice cream (ii) lemonade (iii) Air (iv) soil**

* **Ice cream** is a mixture of milk, sugar, cream, water, sugar etc.
* **Lemonade** is a mixture of lemon juice, sugar and water.
* **Air** is mixture of Oxygen, Nitrogen carbon dioxide and other gases.
* **Soil** is a mixture of sand, clay, various salts

## VI. ANSWER BRIEFLY.

**1. Which of the following are pure substances? Ice, Milk, Iron, Hydrochloric acid, Mercury, Brick and Water.**

Ice, Iron, Hydrochloric acid, Mercury and water are pure substances.

**2. Oxygen is very essential for us to live. It forms 21% of air by volume. Is it an element or compound?**

Oxygen is an element.

**3. You have just won a medal of 22-carat gold. Have you just procured a pure substance or impure substance?**

Impure substance because 24 carat gold is the true form.

**4. How will you separate a mixture containing saw dust, napthalene and iron filings?**

We can separate a mixture of naphthalene, saw dust and iron fillings by sublimation and by using a magnet. In this way the naphthalene will sublime, the iron fillings will get attracted towards the magnet and the saw dust will remain back there.

**5. How are homogenous solutions different from heterogenous solution? Explain with example:**

| S.NO | HOMOGENEOUS SOLUTIONS | HETEROGENEOUS SOLUTIONS |
|---|---|---|
| 1. | Components are uniformly mixed | Components are not uniformly mixed. |
| 2. | It has single phase. | It has two or more distinct phases. |
| 3. | No boundaries of separation between the components. | There are visible boundaries between the components. |
| 4. | Components are invisible to naked eye. | Components are visible to naked eye. |
| 5. | Lemonade, petrol etc. | Water, petrol in water, and sand in water. |

## VII. ANSWER IN DETAIL.

1. Write the difference between elements and compounds and give an example for each

| S.NO | ELEMENTS | COMPOUNDS |
|---|---|---|
| (i) | Made up only one kind of atom | Made up of more than one kind of atom. |
| (ii) | Cannot be broken down into simpler substances | Can be broken down into Elements by chemical methods |
| (iii) | The smallest particle that retains an its properties is the atom. | The smallest particle that retains all its properties is the molecule. |
| (iv) | Eg: Copper(Cu) Silicon(Si) Gold(Au) | Eg: Water $H_2o$, Carbon-di-oxide $Co_2$, Ammonia $NH_3$ |

**2. Explain Tyndall effect and Brownian movement with suitable diagram**

**A. Tyndall Effect**

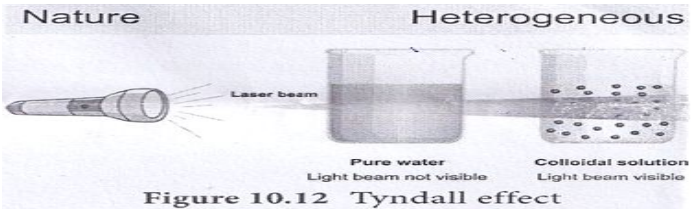


Figure 10.12 Tyndall effect

* When a strong beam of light is focused on a colloidal solution the path of the beam becomes visible.
* This phenomenon is called as Tyndall effect. The illuminated path is called Tyndall cone. This phenomenon is due to scattering of light by colloidal particles.

**B. Brownian movement:**

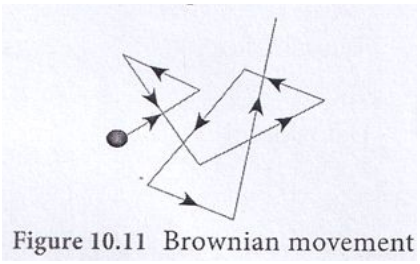


Figure 10.11 Brownian movement

* It is a kinetic property. When colloidal solution are viewed under powerful microscope, it can be seen that colloidal particles are moving constantly and rapidly in zig-zag directions.
* The Brownian movement of particles is due to the unbalanced bombardment of the particles by the molecules of dispersion medium.

**3. How is mixture of common salt, oil and water separated? You can use a combination of different methods.**

* The mixture of common salt, oil and water are taken in a beaker. The salt dissolves in water. Allow it to stand for a few minutes.
* The mixture of two immiscible liquids is separated by a separating funnel. The oil floats on top.
* The water can carefully be separated by opening the stopcock in the separating funnel. The oil is left behind in the separating funnel.
* The salt water is heated slowly, in a distillation flask with a water condenser. The pure water vapour passes through the inner tube of the condenser.
* The vapours on cooling condense into pure water and are collected in a receiver. The salt is left behind in the flask as a residue.

## UNIT 11 ATOMIC STRUCTURE

### I. CHOOSE THE CORRECT ANSWER .

1. Among the follwoing the odd pair is
   a) $^{18}O_8$, $_9{}^{19}F$ **b) $^{40}Ar_{15}$, $^{14}N_7$** c) $^{30}Si_{14}$, $^{31}P_{15}$ d) $^{54}Cr_{24}$, $^{39}K_{19}$
2. Change in the number of neutrons in an atom changes it to
   a) an ion **b) an isotope** c) an isobar d) another element
3. The term nucleons refer to
   a) protons and elecrtons b) only neutrons
   c) electrons and neutrons **d) protons and neutrons**
4. The number of protons, neutrons and electrons present respectively in $^{80}_{35}Br$ are
   a) 80,80,35 b) 35,55,80 c) 35,35,80 **d) 35,45,35**
5. The correct electronic configuration of potassium is
   a) 2,8,9 b) 2,8,1 **c) 2,8,8,1** d) 2,8,8,3
6. Hydrogen atom does not have _____
   a) Proton **b) Neutron** c) Electron d) Proton and electron
7. Co-60 is used in the treatment of _____
   **a) Cancer** b) thyroid disorders
   c) Leukemia d) Blockage of arteries
8. The maximum number of electrons that can be accommodated in M shell is _____
   a) 2 b) 8 **c) 18** d) 32
9. The electronic configuration of Chlorine is _____
   a) 2,7 b) 2,8,8,7 **c) 2,8,7** d) 2,7,8
10. _____ is radioactive isotope present in our body
    a) Cobalt 60 b) Uranium 235 c) Iodine 131 **d) Potassium 40**

### II. STATE WHETHER TRUE OR FALSE.IF FALSE CORRECT THE STATEMENT.

1. In an atom, electrons revolve around the nucleus in fixed orbits - **True**
2. Isotopes of an element have different atomic numbers- **False**
   **Correct statement** : Isotopes of an element have the different mass Number

3. Electrons have negligible mass and charge -**False**
   Correct statement : Electrons have neglible mass and have negative charge.
4. Smaller the size of the orbit , lower is the energy of the orbit - **True**
5. The maximum number of electron is L shell is 10 - **False**
   **Correct statement** : The maximum number of electrons in L shell is **8**

## III. FILL IN THE BLANKS.

1. Calcium and Argon are examples of a pair of ____ **(Isobars)**
2. Total number of electrons that can be accomodated in an orbit is given by __ **($2n^2$)**
3. ____ isotope is used in the nuclear reactors. **(Uranium - 235)**
4. The number of neutrons present in $^{7}_{3}Li$ is ___ **(4)**
5. The valency of Argon is ____ **(O)**
6. Atomic number of element is 20. It has ___ valence electrons. **(Uranium-235)**
7. A ____ number describes, a specific aspect of an electron. **(quantum)**
8. Atomic orbitals allow atoms to make_____bonds **(co-valent)**
9. The ratio of masses of H and O in $H_2O$ is ____ **(1:8)**
10. Elements with 4 to 7 in their valence shell are _____ **(non-metals)**

## IV. MATCH THE FOLLOWING.

| | | | |
|---|---|---|---|
| 1. | Dalton | - | first atomic theory |
| 2. | Chadwick | - | discovery of neutrons |
| 3. | Rutherford | - | discovery of nucleus |
| 4. | Neils Bohr | - | hydrogen atom model |

## V. COMPLETE THE FOLLOWING TABLE.

| Atomic Number | Mass Number | No of Neutrons | No of Protons | No of Electrons | Name of the element |
|---|---|---|---|---|---|
| 9 | 19 | 10 | 9 | 9 | Fluorine |
| 16 | 32 | 16 | 16 | 16 | Sulphur |
| 12 | 24 | 12 | 12 | 12 | Magnesium |
| 1 | 2 | 1 | 1 | 1 | Hydrogen Deuterium |
| 1 | 1 | 0 | 1 | 1 | Hydrogen Protium |

## VI. ANSWER VERY BRIEFLY.

1. **Name an element which has the same number of electrons in its first and second shell.**
   Beryllium

2. **Write the electronic configuration of K and Cl**
   Electronic configuration of K (**Potassium**) **2,8,8,1**
   Electronic configuration of Cl (**Chlorine**) **2,8 ,7**

3. **Write down the names of the particles represented by the following symbols and explain the meaning of superscript and subscript numbers attached**

| Symbol | Name of the Particle | Super script No | Subscript No |
|---|---|---|---|
| $_1H^1$ | Protium | 1 | 1 |
| $_0n^1$ | Neutron | 1 | 0 |
| $_{-1}e^o$ | Electron | O | -1 |

4. **For an atom 'X', 'K', 'L' and M shell are completely filled. How many electrons will be present in it?**
   18

5. **What is the same about electrons structure.**

   **(a) Lithium Sodium and Potassium**

   **(b) Beryllium, Magnesium and Calcium**

   (a) Lithium, Sodium & Potassium have 1 electrons in their outer most shell. Their valency is 1

   (b) Beryllium,Magnesium and Calcium have 2 electrons in their outermost shell. Their valency is 2.

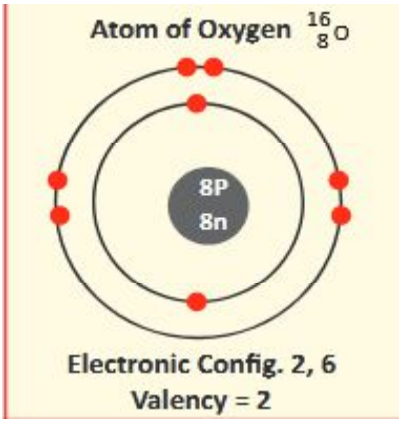
## VII. ANSWER BRIEFLY.

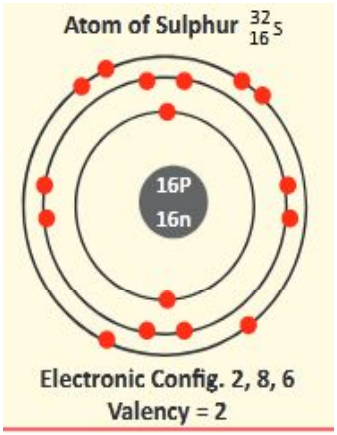
1. **How was it shown that atom has empty space?**
   In 1911, Lord Rutherford, a scientist performed his experiment of bombarding a thin gold foil with very small positively charged particles called alpha particles. He selected a gold foil because, he wanted as thin layer as possible and gold is the most malleable metal.
   He observed that:
   * Most of the alpha particles passed straight through the foil.
   * Some alpha particles were slightly deflected from their straight path
   * Very few alpha particles completely bounced back.

   By this experiment he inferred that most of the space in the atom is empty

2. **Why do $_{17}Cl^{35}$ and $_{17}Cl^{37}$ have the same chemical properties? In what respect do these atom differ?**
   **$_{17}Cl^{35}$ and $_{17}Cl^{37}$** are isotopes.Isotopes are atoms of the same elements which have **same atomic number (electrons) but different mass number (neutrons).**
   Chemical properties depend on number of electrons $_{17}Cl^{35}$ and $_{17}Cl^{37}$ have same number of electrons so they have same chemical properties.
   They differ by having different mass number ( neutrons)

3. **Draw the structure of oxygen and sulphur atoms**




4. **Calculate the number of neutrons protons and electrons**

**(i) Atomic number 3 and mass number 7**

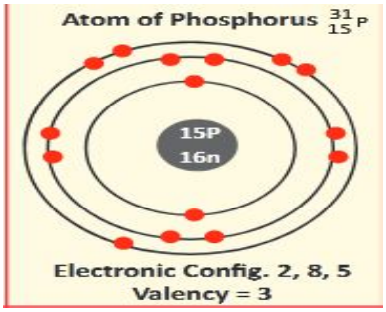
Atomic number (Z) = No of protons= No of electrons=3
Mass number (A)= No of protons + No of neutrons=7
No of neutrons = A-Z = 7-3=4

**(ii) Atomic number 92 and mass number 238**

Atomic number (Z) = No of protons= No of electrons=92
Mass number (A)= No of protons + No of neutrons=238
No of neutrons = A-Z = 238-92=146

5. **What are nucleons? How many nucleons are present in phosphorous? Draw its structure.**

The protons and neutrons are collectively called nucleons . These are found in the nucleus of an atom.
Number of nucleons present in phosphorous is 31.




## VIII. ANSWER IN DETAIL.

1. **What conclusion were made from the observation of gold foil experiment?**

Rutherford generalized the conclusions of the gold foil experiment and suggested a model of the atom known as Rutherford's Atomic model.

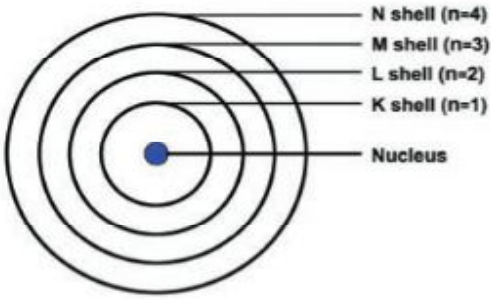
Rutherford's Atomic model : According to this model

* The atom contains large empty space.
* There is a positively charged mass at the centre of the atom, known as nucleus.
* The size of the nucleus of an atom is very small compared to the size of an atom.
* The electrons revolve around the nucleus in close circular paths called orbits.
* An atom as a whole is electrically neutral, i.e., the number of protons and electrons in an atom are equal.

**2. Explain the postulates of Bohr's atomic model**

The main postulates **of Bohr's atomic model are:**

* In atoms, the electron revolve around the nucleus in stationary circular paths called orbits or shells or energy levels.
* While revolving around the nucleus in an orbit, an electron neither loses nor gains energy.
* An electron in a shell can move to a higher or lower energy shell by absorbing or releasing a fixed amount of energy.
* The orbits or shells are represented by the letters K,L,M,N,... or the numbers, n= 1,2,3,4.....




**3. State the Gay Lussac's Law of combining volumes. Explain with an illustration**

* According to Gay Lussac's Law, whenever gases react together, the volumes of the reacting gases bear a simple ratio, and the ratio is extended to the product when the product is also in gaseous state, provided all the volumes are measured under similar conditions of temperature and pressure.
* This law may be illustrated by the following example.
* It has been experimentally observed that one volume of hydrogen reacts with one volume of chlorine to form two volumes of hydrogen chloride
* The ratio of volume which gases bears is 1:1:2 which is a simple whole number ratio.

$$1\ H_2 + 1\ Cl_2 \text{----------} > 2\ HCl$$

# UNIT 12 PERIODIC CLASSIFICATION OF ELEMENTS

## I. CHOOSE THE CORRECT ANSWER.

1. If Dobereiner is related with 'law of traids'. then Newlands is related with
   a) Modern periodic law b) Hund's rule
   **c) Law of octaves** d) Pauli's exclusion principle
2. Modern periodic law states that the physical and chemical properties of elements are the periodic functions of their
   **a) atomic numbers** b) atomic masses c) similarities d) anomalies
3. Elements in the modern periodic table are arranged in _____ groups and ____ periods.
   a) 7, 18 **b) 18, 7** c) 17, 8 d) 8, 17
4. Noble gases are placed in _____ group in the modern periodic table.
   a) 13th **b) 18th** c) 17th d) 2nd
5. d-block elements are otherwise known as _____
   **a) transition elements** b) inner transition elements
   c) halogens d) alkali metals
6. Which of the following non-metals can form alloys with metals?
   a) Gold b) silver c) copper **d) all the above**
7. Group 16 elements are collectively called as ___
   **a) Chalcogen family** b) carbon family c) halogens d) nitrogen family

## II. FILL IN THE BLANKS .

1. In Dobereiner's traids, the atomic weight of the middle element is the ___ of the atomic masses of 1st and 3rd elements. **(average**)
2. Noble gases belong to ___ group of the periodic table.**(18$^{th}$)**
3. The basis of the classifications proposed by Dobereiner, Newlands and Mendeleev was _____ **(Atomic masses).**
4. Example for liquid metal is ____ **(Mercury)**
5. ____ group elements are called alkaline earth metal. **(Second)**
6. _____ proposed the law of periodicity. **(Dmitri Mendeleev)**
7. f - Block elements are also called as _____ **(inner transition elements)**
8. __ element is placed at the bottom of the periodic table. **(f-block**)
9. When a metal is alloyed with mercury , it is called ___ **(amalgam)**
10. Elements are placed in periods based on the number of ____ **(shells in their atoms)**

## III. MATCH THE FOLLOWING .

| | | | |
|---|---|---|---|
| 1. | Triads | - | Dobereiner |
| 2. | Alkali metal | - | Sodium |
| 3. | Law of octaves | - | Newlands |
| 4. | Alkaline earth metal | - | Calcium |
| 5. | Modern periodic law | - | Henry Moseley |

## IV. STATE WHETHER TRUE OR FALSE, IF FALSE CORRECT THE STATEMENT:

1. Newlands periodic table is based on atomic masses of elements and modern periodic table is based on atomic number of elements -**True**
2. Metals can gain electrons - **False**
   **Correct statement** : Metals can lose electrons.
3. Alloys bear the characteristics of both metals and non metals - **False**
   **Correct statement** : Metalloids bear the characteristics of both metals and non metals.
4. Lanthanides and actinides are kept at the bottom of the periodic table because they resemble each other but they do not resemble with any other group elements - **True**
5. Group 17 elements are named as Halogens - **True**

## V ASSERTION AND REASON TYPE QUESTIONS.

1. **Statement**: Elements in a group generally possess similar properties but elements along a period have different properties.
   **Reason**: The difference in electronic configuration makes the element differ in their chemical properties along a period.
   **a) Statement is true and reason explains the statement.**
   b) Statement is false but the reason is correct.

## V. ANSWER THE FOLLOWING.

**1. State modern periodic law**

"The chemical and physical properties of the elements are the periodic functions of their atomic numbers"

**2. What are group and periods in the modern periodic table?**

* The horizontal rows are called periods. There are seven periods in the periodic table.
* Vertical columns in the periodic table starting from top to bottom are called groups. There are 18 groups in the periodic table

**3. What are the limitations of Mendeleev's periodic table?**

* Elements with large difference in properties were included in the same group.
  Eg: Hard metals like copper (Cu) and silver (Ag) were included along with soft metals like sodium (Na) and potassium (K)
* No proper position could be given to the element hydrogen. Non-metallic hydrogen was placed along with metals like lithium (Li), sodium (Na) and potassium (K).
* The increasing order of atomic mass was not strictly followed throughout. Eg. Co & Ni, Te & I.
* No place for isotopes in the periodic table.

**4. State any five features of modern periodic table**

**Features of Modern Periodic Table**

* All the elements are arranged in the increasing order of their atomic number.

* The horizontal rows are called periods.There are seven periods in the periodic table.
* The elements are placed in periods based on the number of shells in their atoms.
* Vertical columns in the periodic table starting from top to bottom are called groups. There are 18 groups in the periodic table.
* Based on the physical and chemical properties of elements, they are grouped into various families.

**REF TEXT BOOK PAGE NO 142 FOR PERIODIC TABLE OF THE ELEMENTS**

## UNIT-13 CHEMICAL BONDING

**I CHOOSE THE CORRECT ANSWER .**

1. Number of valence electrons in carbon is
   a) 2 **b) 4** c) 3 d) 5
2. Sodium having atomic number 11,is ready to _____ electron /electrons to attain the nearest noble gas electronic configuration .
   a) gain one b) gain two **c) lose one** d) lose two
3. The element that would form anion by gaining electrons in a chemical reaction is _____
   a) potassium b) calcium **c) fluorine** d) iron
4. Bond formed between a metal and non metal atom is usually _____
   **a) ionic bond** b) covalent bond c) coordinate bond
5. _____ compounds have high melting and boiling points
   a) Covalent b) Coordinate **c) Ionic**
6. Covalent bond is formed by _____
   a) transfer of electrons **b) sharing of electrons** c) sharing a pair of electrons
7. Oxidising agents are also called as _____ because they remove electrons from other substances
   a) electron donors **b) electron acceptors**
8. Elements with stable electronic configurations have eight electrons in their valence shell .They are _____
   a) halogens b) metals **c) noble gases** d) non metals
9. Which of the following atom can exist independently ?
   a) Magnesium b) Chlorine c) Hydrogen **d) Neon**
10. Alkali and alkaline earth metals form ___ compound when they react with non metals
    **a) ionic** b) covalent
    c) co- ordinate covalent d) all the above

**II. FILL IN THE BLANKS.**

1. The valency of noble gases is ____**(zero).**
2. The atom that loses electrons will form a _____**(cation)**.
3. ____ compounds have high density**.(Ionic)**
4. _____is the tendency of an atom in a molecule to attract towards itself the **shared pair of** electrons.**(Electronegativity)**
5. Ionic compounds are ____ in nature. **(solid)**

6. Reducing agents are also called as ____ **(Electron donors**)
7. The oxidation reaction in food materials that were left open for a long period is responsible for spoiling of food. This is called ____ **(Rancidity)**.
8. The sum of oxidation number of all atoms in a compound is ___ (**zero)**
9. ___ is a metal that has high resistance to corrosion.**(Gold)**
10. Molecular reactions are ____ in covalent compound.(**slow**)

## III ANSWER BRIEFLY.

**1. How do atoms attain noble gas electronic configuration ?**

* Atoms of all elements,other than inert gases,combine to form molecules because they have incomplete valence shell and tend to attain a stable electronic configuration similar to noble gases.

**2. NaCl is insoluble in carbon tetra chloride but soluble in water . Give reason**

* NaCl is an ionic compounds, Ionic compounds are soluble in polar solvents like water.
* They are insoluble in non-polar solvents like benzene ($C_6H_6$), carbon tetra chloride ($CCl_4$).

**3. Explain octet rule with an example**

The tendency of atoms to have eight electrons in the valence shell is known as the 'Octet rule' or the 'Rule of eight'

For Example, Sodium with atomic number 11 will readily loose one electron to attain Neon's stable electronic configuration.

**4. Write a note on different types on bonds**

Different types of bonding that are considered to exist in molecules are categorized as the Ionic bond, Covalent bond and Coordinate Covalent bond.

* I**onic or Electrovalent bond.**
  Bonds formed between cation and anion because of the transfer of electrons from one atom to other atom.
* **Covalent bond.**
  Bonds formed between atom by the mutual sharing of electrons.
* **Coordinate Covalent bond.**
  Bonds formed between atom by the mutual sharing of electrons which are supplied by one atom.

**5. Correct the wrong statements**

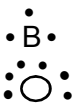
**a) Ionic compounds dissolve in non polar solvents**

Ionic compounds dissolve in polar solvents.

**b) Covalent compounds conduct electricity in molten or solution state.**

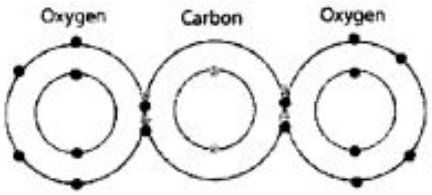
Ionic compounds conduct electricity in molten or solution state.

**6. Complete the table given below**



| Element | Atomic number | Electron distribution | Valence electrons | Lewis dot structures |
|---|---|---|---|---|
| Lithium | 3 | 2,1 | 1 | Li |
| Boron | 5 | 2,3 | 3 | |
| Oxygen | 8 | 2,6 | 6 | O |

**7. Draw the electron distribution diagram for the formation of Carbon di oxide ($CO_2$) molecule**




Carbon di oxide Molecule

**8. Fill in the following table according to the type of bonds formed in the given molecule. $CaCl_2$, $H_2O$, CaO, CO, KBr, HCl, $CCl_4$, HF, $CO_2$, $Al_2Cl_6$**

| Ionic bond | Covalent bond | Coordinate covalent bond |
|---|---|---|
| CaO | $H_2O$, HF,HCl | CO |
| $CaCl_2$ | $CO_2$, | $Al_2Cl_6$, |
| KBr | $CCl_4$, | |

**9. The property which is characteristics of an ionic compound is that**

1. It often exist as gas at room temperature.
2. **It is hard and brittle.**
3. It undergoes molecular reactions
4. It has low melting point

**10. Identify the following reactions as oxidation or reduction**

**a.Na --------> $Na^+ + e^-$ (Oxidation)**

**b) $Fe^{3+} + 2\ e^-$ ----------> $Fe^+$ (Reduction)**

**11. Identify the compounds as Ionic/ Covalent /Coordinate based on the given characteristic**

**a.Soluble in non polar solvents.( Covalent and Coordinate Compunds)**

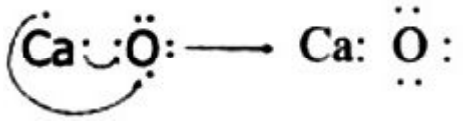
**b.Undergoes faster / instantaneous reaction.(Ionic)**

**c.Non conductors of electricity.( Covalent and Coordinate Compunds)**

**d.Solids at room temperature.(Ionic)**

**12. An atom X with atomic number 20 combines with atom Y with atomic number 8 . Draw the dot structure for the formation of the molecule XY.**

Atom X is Calcium with atomic number 20 and atom Y is Oxygen with atomic number 8.



**13. Considering $MgCl_2$ as ionic compound and $CH_4$ as covalent compound give any two differences between these two compounds**

| $MgCl_2$ | $CH_4$ |
|---|---|
| Ionic compounds are crystalline solids at room temperature | It occurs in gaseous state |
| Soluble in polar solvents and insoluble in non-polar solvent | Soluble in non-polar solvents and insoluble in polar solvents |

**14. Why are Noble gases inert in nature ?**

* Noble gases are inert in nature due to the completely filled subshells and thus have stable electronic structures which is very difficult to change.
* The elements Helium, Neon, Argon, Krypton, Xenon and Radon of group 18 in the periodic table are Noble gases.

## III ANSWER IN DETAIL.

**1. List down the differences between ionic and covalent compounds**

| Ionic Compounds | Covalent compounds |
|---|---|
| a. Ionic compounds are crystalline solids at room temperature. | Covalent compounds exists in solid, liquid and gaseous form. |
| b. Strong electrostatic force of attraction cations and anions | Mutual sharing of electrons and so weak force of attraction between atoms |
| c. Solids at room temperature | Gases, liquid and soft solid |
| d. Conducts electricity in molten state | Non - conductors of electricity |
| e. Have high melting and boiling points | Have low melting and boiling points |
| f. Hard and brittle | soft and waxy |
| g. Soluble in polar solvents | Soluble in non polar solvents |
| h. Undergo ionic reaction which are rapid | Undergo molecular reactions which are slow |

**2. Give an example for each of the following statements.**

**a) a compound in which two Covalent bonds are formed**

**b) a compound in which one ionic bond is formed**

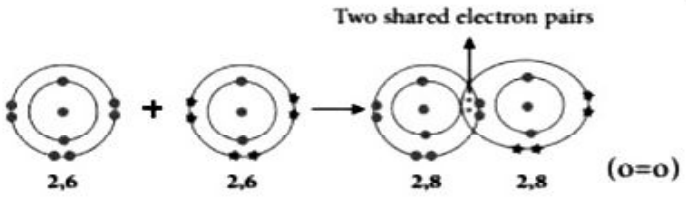
**c) a compound in which two Covalent and one Coordinate bonds are formed**

**d) a compound in which three covalent bonds are formed**

**e) a compound in which Coordinate bond is formed**

**(a) <u>Formation of oxygen molecule</u> ($O_2$)**

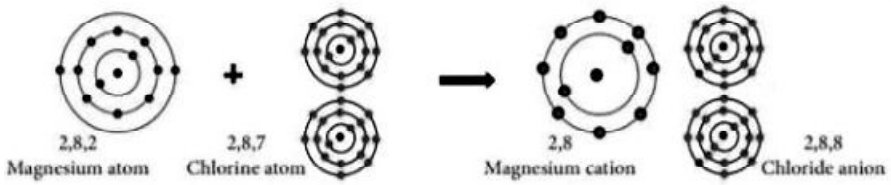
Each oxygen atom has six valence electrons (2, 6). These two atoms achieve a stable electronic configuration (octet) by sharing two pair of electrons. Hence a double bond is formed in between the two atoms.




Formation of covalent bond in oxygen molecule

**(b). <u>Formation of Magnesium Chloride</u> ($MgCl_2$)**

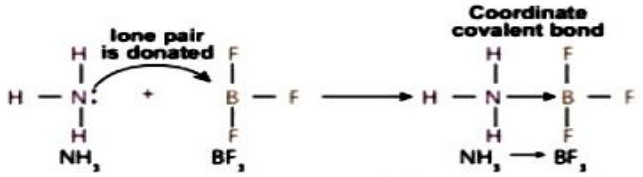
Magnesium Chloride ($MgCl_2$) is an ionic compound formed when the magnesium ion loses two electrons to gain the noble state which is accepted by chloride ion.




**Formation of ionic bond in magnesium chloride**

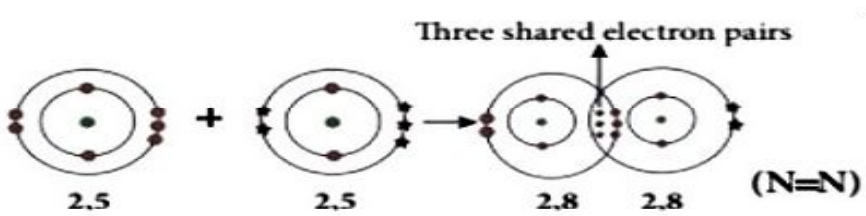
**(c). <u>Formation of coordinate covalent bond between</u> $NH_3$ ---->$BF_3$ molecules**

$NH_3$ ---->$BF_3$ is a compound formed by coordinate covalent bonding. Here one pair of electrons from ammonia molecule is shared with electron deficit boron trifluoride. This type of bonding is also known as Dative bond.



**(d). <u>Formation of nitrogen molecule</u> ($N_2$)**

Nitrogen molecule ($N_2$) is formed by three covalent bonds where three pairs of electrons are shared between the two to achieve a stable configuration.




Formation of covalent bond in nitrogen molecule

**(e). <u>Formation of coordinate covalent bond in ammonium ion</u> ($NH_{4+}$)**

**I**n ammonia molecule the central nitrogen atom has five valence electrons (2,5) among which three electrons are shared with three hydrogen atoms and still it has an unshared lone pair of electrons. This lone pair electrons are donated to a Hydrogen ion and thus a N --> H coordinate covalent bond is formed in ammonium ion molecule ($NH_{4+}$)

**3. Identify the incorrect statement and correct them**

**(a). Like covalent compounds, Coordinate compounds also contain charged particles (ions). So they are good conductors of electricity - False**

**Correct statement:** Like covalent compounds, coordinate compounds also do not contain charged particles (ions), so they are bad conductors of electricity.

**(b). Ionic bond is a weak bond when compared to Hydrogen bond.- False**

**Correct statement**: **I**onic bond is a stronger bond when compared to Hydrogen bond.

**(c). Ionic or electrovalent bonds are formed by mutual sharing of electrons between atoms. - False**

**Correct statement:** Covalents bonds are formed by mutual sharing of electrons between atoms.

**(d). Loss of electrons is called Oxidation and gain of electron is called Reduction. - True**

**(e). The electrons which are not involved in bonding are called valence electrons.**

**Correct statement:** The electrons which are involved in bonding are called valence electrons.

**4. Discuss in brief about the properties of coordinate covalent compounds.**

The compounds containing coordinate covalent bonds are called coordinate covalent compounds.

* **<u>Physical state</u>** – These compounds exist as gases, liquids or solids.

* **Electrical conductivity** – They do not contain charged particles (ions), so they are bad conductors of electricity.
* **Melting point** – They have Higher melting and boiling points than purely covalent compounds lower than purely Ionic compounds.
* **Solubility** – Insoluble in polar solvents and like water but are soluble in non-polar solvents like benzene.
* **Reactions** – They undergo molecular reactions.

**5. Find the oxidation number of the elements in the following compounds,**

**(a) C in $CO_2$**

**Oxidation number of C in $CO_2$**

Oxidation number of O = - 2

Let Oxidation number of C be x

1(x)+2(O)=0

1(x)+2(- 2)=0

x-4=0

x=4

**Oxidation number of C in $CO_2$ is +4**

**(b) Mn in $MnSO_4$**

**Oxidation number of Mn in $MnSO_4$**

Oxidation number of O = -2

Oxidation number of S = +6

**Let Oxidation number of Mn be x**

1(M)+1(S)+4(O) =0

1(x)+1(6)+4(-2) =0

x+6-8 =0

x-2 =0

x =2

**Oxidation number of Mn in $MnSO_4$ is 2**

**(c) N in $HNO_3$**

**Oxidation number of H =+1**

Oxidation number of O=-2

Let Oxidation number of N be x

1(H)+1(N)+3(O)=0

1(+1)+1(x)+3(-2)=0

1+x-6=0

x-5=0

x=5

**Oxidation number of N in $HNO_3$ is 5**

## UNIT-14 ACIDS , BASES AND SALTS

### I CHOOSE THE CORRECT ANSWER.

1. Zn + 2 HCl ---> $ZnCl_2$ + ------->
   **a) $H_2$** b) $O_2$ c) $CO_2$
2. Apple contains malic acid . Orange contains _____
   a) citric acid **b) ascorbic acid**
3. Acids in plants and animals are organic acids . Whereas acids in rocks and minerals are _____
   **a) Inorganic acids** b) Weak acids
4. Acids turn blue litmus paper to _____
   a) Green **b) Red** c) Orange
5. Since metal carbonate and metal bicarbonate are basic , they react with acids to give salt and water with the liberation of _____
   a) $NO_2$ b) $SO_2$ **c) $CO_2$**
6. The hydrated salt of copper sulphate has _____ colour
   a) Red b) White **c) Blue**
7. Acid secreted in our stomach is _____
   **a) Hydrochloric acid** b) Sulphuric acid c) Nitric acid d) Carbonic acid
8. Few metals do not react with sodium hydroxide, example _____
   a) Mg **b)Cu** c) K d) Li
9. The formula of bleaching powder is _____
   a) $CaCl_2$ **b) $CaOCl_2$** c) $Ca(OH)_2$ d) CaO
10. Curd contains _____ acid
    a) malic b) formic **c) lactic** d) ascorbic

### II FILL IN THE BLANKS.

1. Acid reacts with base to form a neutral product called ____ **(salt**.)
2. The taste of acid is ____ (**sour)**.
3. ___ contain one or more replaceable hydrogen atoms. **(Acids)**
4. Acids react with metallic oxides to produce ____ **(salt and water.)**
5. _____ is used in aerated drinks. **(Carbonic acid)**
6. Chemical formula of aquaregia is _____ **(3 HCl + $HNO_3$.)**
7. Water soluble bases are called ____ **(alkali.)**
8. ____ are bitter in taste. **(Bases)**
9. Acids turn blue litmus to ____ **(red)**
10. The pH value of acids are_____than 7.**(lesser )**

### III ANSWER IN BRIEFLY.

**1. Classify the various types of acids based on their sources**

Based on their sources, acids are classified into

* Organic Acids: Acids present in plants and animals (living things) are organic acids.Example: HCOOH.

* Inorganic Acids: Acids prepared from rocks and minerals are inorganic acids or mineral acids. Example: HCl, $HNO_3$, $H_2SO_4$

**2. Write any four uses of acids.**

* Sulphuric acid is used in car batteries .
* Hydrochloric acid is used as a cleansing agent in toilets.
* Carbonic acids is used in aerated drinks.
* Nitric acid is used in the manufacture of fertilizers, dyes, paints and drugs.

**3. Give the significance of pH of soil in agriculture**

In agriculture , the pH of soil is very important . Citrus fruits require slightly alkaline soil rice requires acidic soil sugarcane requires neutral soil

**4. What are the various uses of Aquaregia ?**

* It is used chiefly to dissolve metals such as gold and platinum
* It is used for cleaning and refining gold

**5. What are the uses of plaster of paris ?**

* It is used for plastering bones
* It is used for making casts for statues

**6. Two acids 'A' and B are given . Acid A gives one hydrogen ion per molecules of the acid in solution . Acid B gives two hydrogen ions per molecule of the acid in solution (i) Find out acid A and acid B (ii) Which acid is called the king of chemicals ?**

* Acid A is Hydrochloric acid and Acid B is Sulphuric acid
* Sulphuric acid is called the King of Chemicals

**7. Define aquaregia**

Aquaregia is a mixture of hydrochloric acid and nitric acid prepared optimally in a / molar / ratio of 3:1.

It has the ability to dissolve the noble metals such as gold, platinum and palladium.

**8. Correct the mistakes**

(**a) Washing soda is used for making cakes and bread soft ,spongy.**

**Baking powder** is used for making cakes and bread soft , spongy.

**(b) Calcium sulphate hemihydrate is used in textile industry.**

**Calcium Oxychloride** is used in textile industry.

**9. What is neutralization reaction ? Give an example .**

The reaction reaction between a base and an acid is known as neutralization reaction.

**$HCl + NaOH \rightarrow NaCl + H_2O$**

## IV ANSWER IN DETAIL.

**1. Differentiate hydrate and anhydrous salts with examples ?**

| HYDRATED SALTS | ANHYDROUS SALTS |
|---|---|
| a. Hydrons is a term used to explain substance that contains water as a constituent | Anhydrous is a term used to explain a substance that does not contain water as a constituent |
| b. Composed of water molecules | Not composed of water molecules |
| .c.These are known as hydrates | These are known as anhydrates |
| d. Hygroscopic compounds can from hydrous compounds by absorption of water from the air. Ex $Cu So_4$ 5 $H_2O$ ( blue vitrol) | Anhydrous compounds can absorb water from the air. Eg. $Cu So_4$ |

**2. Give the tests to identify acids and bases**

**a) Test with a litmus paper:**

* An acid turns blue litmus paper into red.
* A base turns red litmus paper into blue.

**b) Test with an indicator Phenolphthalein:**

* In acid medium, phenolphthalein is colourless.
* In basic medium, phenolphthalein is pink in colour.

**c) Test with an indicator Methyl orange:**

* In acid medium, methyl orange is pink in colour.
* In basic medium, methyl orange is yellow in colour

**3. Write any four uses of bases**

* Sodium hydroxide is used in the manufacture of soap.
* Calcium hydroxide is used in white washing of building.
* Magnesium hydroxide is used as a medicine for stomach disorders.
* Ammonium hydroxide is used to remove grease stains from clothes.

**4. Write any five uses of salts**

* **Common Salt** (NaCl) is used in our daily food and used as a preservative
* **Washing Soda** (Sodium Carbonate) It is used in softening hardwater.
* **Baking Soda** (Sodium bicarbonate -$NaHCO_3$) It is used in making of baking powder which is a mixture of baking soda and tartaric acid.
* **Bleaching powder** (Calcium Oxychloride-$CaOCl_2$)It is used as disinfectant.
* **Plaster of paris** It is used for plastering bones.

**5. Sulphuric acid is called king of chemicals why is it called so ?**

* Sulphuric acids is called king of chemicals because it is used in the preparation of many other compounds.
* It is called so due to its direct and indirect applications in the manufacture of many other compounds.
* It is used to clean up rust form steel roll sand soap.
* It replaces salts from weaker acids.
* It is corrosive and acts as a good dehydrant.

## UNIT-15 CARBON AND ITS COMPOUNDS

### I. CHOOSE THE CORRECT ANSWER.

1. A phenomenon in which an element exists in different modification in same physical state is called
   a) isomerism **b) allotropy** c) catenation d)crystallinity
2. Carbon forms large number of organic compounds due to _____
   a) Allotropy b) Isomerism c) Tetravalency **d) Catenation**
3. Nandhini brings her lunch everyday to school in a plastic container which has resin code number 5 . The Container is made of _____
   a) Polystyrene b) PVC **c) Polypropylene** d) LDPE
4. Plastics made of polycarbonate (PC) and Acrylonitrile Butadiene Styrene (ABS) are made of resin code _____
   a) 2 b) 5 c) 6 **d) 7**
5. Graphene is one atom thick layer of carbon obtained from _____
   a) diamond b) fullerene **c) graphite** d) gas carbon
6. The legal measures to prevent plastic pollution come under the_____ Protection Act 1988
   a) Forest b) Wildlife **c) Environment** d) Human rights
7. The most recently discovered allotrope of carbon is ____
   a) Graphite b)fullerene **c)Graphene** d) Gas carbon
8. Arrangement of atoms in diamond is_____
   a) Hexagonal b) Trtigonal **c)Tetrahedral** d) Pentagonal
9. Burning of PVC releases _____
   **a) dioxins** b) carbon monoxide
   c)Sulphuric acid d) Chlorine
10. Which of the folowing is highly toxic?
    a) Carbon dioxide **b)Carbon Monoxide**
    c) Calcium Carbonate d)Sodium Bicarbonate

### II. FILL IN THE BLANKS.

1. _____ named carbon. **(Antoine Lavoisier)**
2. Buckminster fullerene contains ___carbon atoms. **(60**)
3. Compounds with same molecular formula and different structural formula are known as _____ **(isomers)**
4. _____is a suitable solven for sulphur (Carbon disulphide )
5. There are ___ plastic resin codes **(seven)**
6. _____ is the main constituent of coal. **(Carbon**)
7. The carbon cycle is the _____ cycle.**(Biogeochemical**)
8. Do not use ____ or school projects. **(Thermocol)**
9. Polycarbonate (pc) plastic contains _____ **(Bisphenol)**
10. Carbon monoxide enters into human body through _____ **(breathing)**

## III. MATCH THE FOLLOWING.

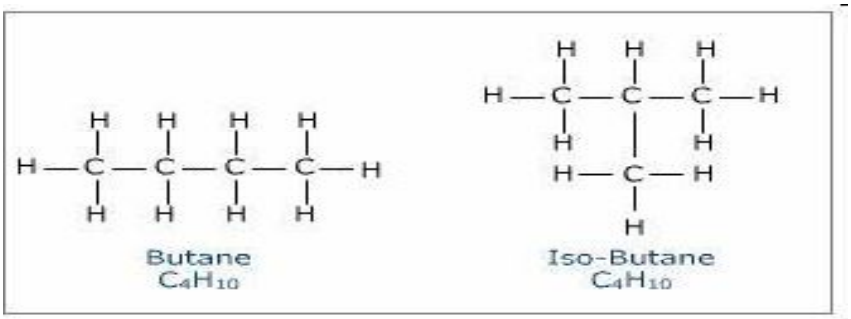
| | | | |
|---|---|---|---|
| 1. | Alkyne | - | Triple bond |
| 2. | Andre Geim | - | Graphene |
| 3. | $C_{60}$ | - | Bucky ball |
| 4. | Thermocol | - | Polystyrene |
| 5. | Combution | - | Oxidation |

## IV. ANSWER IN BRIEFLY.

**1. Differentiate graphite and diamond**

| GRAPHITE | DIAMOND |
|---|---|
| Each carbon has three covalent bonds. | Each carbon has four covalent bonds. |
| Soft , slippery to touch and opaque. | Hard, heavy and transparent. |
| It has planar layers of hexagon units | It has tetrahedral units linked in three dimension. |
| It is a conductor of heat and electricity | It is a non-conductor of heat and electricity. |

**2. Write all possible isomers of $C_4H_{10}$**




**3. Carbon forms only covalent compounds. Why ?**

* Carbon has 4 electrons in its outermost shell, and needs to gain or loss 4 electrons to attain nobel gas configuration.
* Losing or gaining 4 electrons is not possible due to energy considerations, in carbon hence it shares electrons to form covalent bonds.

**4. Define Allotrophy.**

Allotrophy is a property by which an element can exist in more than one form that are physically different and chemcially similar.

**5. Why are one time use and throw away plastics harmful ?**

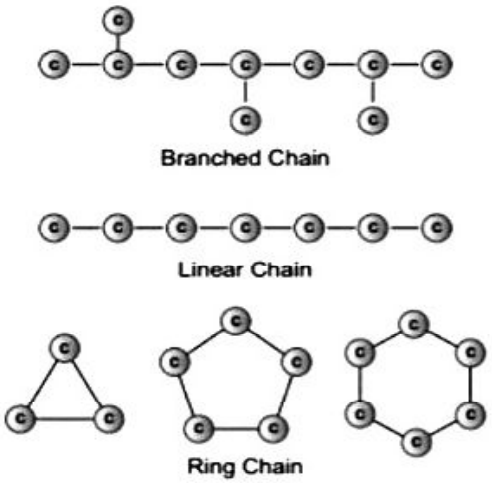
* Use and throw away plastics cause short and long-term environmental damage as they are difficult to recycle.

* These block drains and pollute water bodies.
* These Plastics cause health problems for humans, plants and animals.

## V. ANSWER IN DETAIL.

### 1. What is catenation? How does carbon form catenated compounds?

* Catenation is the binding of an element to itself or with other elements through covalent bonds to form open chain or closed chain compounds.
* Carbon is the most common element which undergoes catenation and forms long chain compounds.
* Carbon atom links repeatedly to itself through covalent bond to form linear chain, branched chain or ring structure.
* This property of carbon itself is the reason for the presence of large number of organic carbon compounds. So organic chemistry essentially deals with catenated carbon compounds.
* For example, starch and cellulose contain chains of hundreds of carbon atoms.Even plastics we use daily life are macromolecules of catenated carbon compounds.




Catenation in carbon

### 2. What are the chemical reactions of carbon?

**Oxidation – (Reaction with oxygen)**

Carbon combines with oxygen to form its oxides like carbon monoxide (CO) and carbon dioxide ($CO_2$) with evolution of heat. Organic carbon compounds like hydrocarbon also undergo oxidation to form oxides and steam with evolution of heat and flame. This is otherwise called Burning,

$$2C_{(s)} + O_{2(g)} \rightarrow 2CO_{(g)} + \text{heat}$$
$$C_{(s)} + O_{2(g)} \rightarrow CO_{2(g)} + \text{heat}$$

**Reaction with steam**

Carbon reacts with steam to form carbon monoxide and hydrogen. This mixture is called water gas.

$$C_{(s)} + H_{(s)}O_{(g)} \text{-->} CO_{(g)} + H_{2(g)}$$

**Reaction with sulphur**

With sulphur, carbon forms its disulphide at high temperature.

$$C_{(s)} + S_{(s)} \text{--> } CS_{2(g)}$$

**Reaction with metals**

At elevated temperatures, carbon reacts with some metals like iron, tungsten, titanium, etc to form their carbides.

$$W_{(s)} + C_{(g)} \text{--> } WC_{(s)}$$

3. **Name the three safer resin codes of plastic and describe their features ?**

* **Resin code 2 (PEHD):** It is light, strong and can be recycled.
* **Resin code 4 (PELD, LLDPE)**: It is very flexible,and soft but strong.
* **Resin code 5 (PP):** It feels waxy or greasy It is light and hard but scratches easily

## VI. HIGHER ORDER THINKING SKILLS.

1. **Why do carbon exist mostly in combined state ?**

   Carbon is an element that can form many different compounds, as each carbon atom can form 4 chemical bonds with other atoms and because the carbon atom is just the right size to fit in comfortably as parts of very large molecules.

2. **When a carbon fuel burns in less aerated room, It is dangerous to stay there why?**

* When carbon fuel burns in less aerated room, carbon monoxide is formed.
* When people are exposed to CO, it enters into human body through breathing and affects the function of haemoglobin.
* CO displaces oxygen from haemoglobin thereby stops its function (supply of oxygen to the parts of body) leading to death.

3. **Explain how dioxins are formed? Which plastic type they are linked to and why they are harmful to humans?**

   Burning PVC (Poly Vinyl Chloride) plastics releases dioxins which are one of the most dangereous chemicals known to humans.

4. **Yugaa wants to buy a plastic water bottle she goes to the shop and sees four different kinds of plastic bottles with resin codes 1,3,5, and 7 which one should she buy? Why?**

* Yugaa should buy plastic bottle with resin code 5. Reason: is considered as one of the safer plastics.
* It is light and hard.
* Bottles with resin code # I can be used only once.

# UNIT-16 APPLIED CHEMISTRY

## I. CHOOSE THE CORRECT ANSWER.

1. One Nanometer is _____
   a) $10^{-7}$ metre b) $10^{-8}$ metre c) $10^{-6}$ metre **d) $10^{-9}$ metre**
2. The antibiotic Penicillin is obtained from _____
   a) plant **b) microrganism** c) animal d) sunlight
3. 1% solution of Iodoform is used as _____
   a) antipyretic b) antimalarial **c) antiseptic** d) antacid
4. The cathode of an electrochemical reaction involves _____
   a) oxidation **b) reduction** c) neutralisation d) catenation
5. The age of a dead animal can be determined by using an isotope of _____
   **a) carbon** b) iodine c) phosphorous d) oxygen
6. Which of the following does not contain natural dyes ?
   **a) Potato** b) Beetroot c) Carrot d) Turmeric
7. This type of food protect us from deficiency diseases_____
   a) Carbohydrates **b) Vitamins** c) Proteins d) Fats
8. Radiochemistry deals with _____
   a)oxidants b) batteries **c) isotopes** d) nanoparticles
9. The groups responsible for the colour of an organic compound is called _____
   a)isotopes b) auxochrome c) chromogen **d) chromophore**
10. Chlorinated hydrocarbons are used as _____
    a)fertilizers **b) pesticides**
    c) food colourants d) preservatives

## II FILL IN THE BLANKS.

1. _____is an electrochemical cell which converts electrical energy into chemical change (Reaction) **(Electrolytic cell**)
2. Painkiller drugs are called _____ **(Analgesics)**
3. Indigo is a ___dye.**(vat)**
4. **____ , _____ and _____**are macronutrients required for plant growth**.**
   **(Nitrogen,Phosphorous and Pottassium )**
5. **_____** is a chemical used in finger print analysis. (**Ninhydrin)**
6. Nanotechnology deals with the materials which are smaller than **___(100 nanometres)**
7. The word 'drug' is derived from the French word 'droque' which means a **___ (dry herb).**
8. _____ is the safest of an anaesthetic drugs. **(Nitrous Oxide)**
9. Malaria is a **____** borne disease. **(Vector)**.
10. The solution having ions is called **____ (Electrolyte)**

## III MATCH THE FOLLOWING.

| | | | |
|---|---|---|---|
| 1. | Antipyretics | - | Fever |
| 2. | Corrosion prevention | - | Electroplating |
| 3. | Hyperthyroidism | - | Iodine -131 |
| 4. | Nanoparticle | - | Large surface area |
| 5. | Proteins | - | Body building |

## IV ANSWER BRIEFLY.

**1. What is Radio Carbon Dating?**

* Radio Carbon dating is a method by which the age of fossil wood or animal is determined using C-14 isotope.
* It is used to determine the age of fossils.

**2. What are called Anaesthetics? How are they classified?**

The drugs which cause loss of sensation are called Anaesthetics.

**Anaesthetics cab be classified into two types namely**

* **General anaesthetics:** They are the agents, which bring about loss of all modalities of sensation, particularly pain along with 'reversible' loss of consciousness.
* **Local anaesthetics:** They prevent the pain sensation in localised areas without affecting the degree of consciousness.

**3. What is the need for chemical fertilizers in crop fields?**

Chemical fertilizers provide the essential micro and macronutrients for crop growth that may not be sufficiently available in the soil.

**4. What is Forensic Chemistry related to?**

Forensic Chemistry applies scientific principles, techniques and methods to the investigation of crime.

## V ANSWER IN DETAIL

**1. Explain the types of dyes based on their method of application?**

**Acid Dyes:**

* These are acidic in nature.
* They are used for dyeing animal fibres and synthetic fibres.
* These can be used for protein fibre such as wool and silk.
  Eg:Picric acid

**Basic Dyes:**

* These are basic dyes containing basic group ($-NH_2$,NHR, $-NR_2$ )
* They are used for dyeing animal fibres and plant fibres.

**Mordant Dyes (or) Indirect Dyes:**

* These dyes have a poor affinity for cotton fabrics and hence do not dye directly.
* They require pretreatment of the fibre with a mordant.
* Mordant is a substance which can be fixed to the fibre and then can be combined with the dye to form an insoluble complex called lake.
* Salts of aluminium, chromium and iron salts are used as mordants.
  Example : alizarin

**Direct Dyes:**

* They have high affinity for cotton, rayon and other cellulose fibre.
* So they ar applied directly as they fix firmly on the fabric.
  Example : Congo red.

**Vat Dyes:**

* It can be used only on cotton and not on silk wool .
* This dyeing is a continuous process and is carried out in a large vessel called vat.
* So it is called as Vat dye.
  Example : Indigo

**2. Name various food additives and explain their functions.**

| S.-No | Types of Additives | Functions of additives | Example |
|---|---|---|---|
| 1 | Preservatives | They protect food from spoilage by microorganism in storage. | Vinegar |
| 2 | Colourants | They give pleasant colours to colours to food | Curcumin |
| 3 | Artificial sweetners | They add sweet taste to food | Saccharin |
| 4 | Flavour enhancers | They are used to enhance the flavour of food items | Monosodium Glutamate |
| 5 | Antioxidants | 1.They prevent the oxidation of food.<br>2. They protect us against cardiovascular disease | Vitamin C |

## VI HIGHER ORDER THINKING SKILLS.

**1. Batteries that are used in mobile phone can be recharged. Likewise, can you recharge the batteries used in watches? Justify your answer.**

* A primary cell cannot be recharged. Watch batteries have a primary cell. In a primary cell, chemical energy is converted into electrical energy when current is drawn from it.
* Whereas mobile phones use secondary cells. In secondary cells electrical energy is converted to chemical energy when current is passed through it and chemical energy is converted to electrical energy when current is drawn from it.

**2. Sudha met with a fire accident. What kind of drug (s), she must take?**

She must take analgesics to relieve pain and Antiseptics to cleanse the wound.

**3. The soil pH of a crop land is 5. What kind of fertilizers should be used in that land?**

Organic fertilizer like compost can be used to maintain $_{P}H$ of soil at 6.5 which is ideal for soil and to moderate the acidity

## UNIT-17 ANIMAL KINGDOM

### I. CHOOSE THE CORRECT ANSWER.

1. Find the group having only marine members.
   a)Mollusca b) Coelenterata **c) Echinodermata** d) Porifera
2. Mesoglea is present in _____
   a)Porifera **b) Coelenterata** c) Annelida d) Arthropoda
3. Which one of the following pairs is not a poikilothermic animal ?
   a)Fishes and amphibians b) Amphibians and aves
   **c)Aves and mammals** d) Reptiles and Mammals
4. Identify the animal having four chambered heart
   a)Lizard b) Snake **c) Crocodile** d) Calotes
5. The animal without skull is _____
   **a)Acrania** b) Acephalia c) Apteria d) Acoelomate
6. Hermaphrodite organisms are _____
   a)Hydra , Tape worm , Earth worm , Amphioxus
   **b)Hydra , Tape worm , Earth worm , Ascidian**
   c)Hydra , Tape worm , Earth worm , Balanoglossus
   d)Hydra , Tape worm , Ascaris , Earth worm
7. Poikilothermic organisms are
   a)Fish, Frog , Lizard , Man b) Fish, Frog , Lizard , Cow
   **c)Fish, Frog , Lizard , Snake** d) Fish, Frog , Lizard , Crow
8. Air sacs and pneumatic bones are seen in _____
   a) Fish b) Frog **c) Bird** d) Bat
9. Excretory organ of tape worm is _____
   **a) Flame cells** b) nephridia c) body surface d) Solenocytes
10. Water vascular system is found in _____
    a) Hydra b) Earthworm **c) Star fish** d) Ascaris

### II FILL IN THE BLANKS.

1. The skeletal framework of porifera is _____ **(spicules)**
2. Ctenidia are respiratory organs in _____ **(Phylum mollusca)**
3. Skates are _____ fishes **(Cartilaginous)**
4. The larvae of an amphibian is _____ **(tadpole)**
5. _____ are jawless vertebrates. **( Cyclostomes )**
6. _____ is the unique characteristic feature of mammal **(Placenta)**
7. Spiny anteater is an example for _____ mammal **(egg laying )**
8. _____ separate the digestive tract from the body wall **(coelom)**
9. The casting off and regrowing of exoskeleton is called _____**(moulting)**
10. _____ is the largest phylum of the animal kingdom **(Arthropoda)**

## III STATE WHETHER TRUE OR FALSE. IF FALSE WRITE THE CORRECT STATEMENT.

1. Canal System is seen in coelenterates **-False**
   **Correct Statement**; Canal system is seen in porifera
2. Hermophrodite animals have both male and female sex organs.-**True**
3. Trachea are the respiratory organ of Annelida - **False**
   **Correct Statement:** Trachea are the respiratory organ of Arthropoda
4. Bipinnaria is the larva of Mollusca -**False**
   **Correct Statement:** Bipinnaria is the larva of Starfish (Echinodermata)
5. Balanoglossus is a cilliary feeder. -**True**
6. Fishes have two chambered heart -**True**
7. Skin of reptilians are smooth and moist -**False**
   **Correct Statement** : Skin of Amphibians are smooth and moist
8. Wings of birds are the modified forelimbs -**True**
9. Female mammals have mammary glands.- **True**

## IV MATCH THE FOLLOWING.

| PHYLUM | EXAMPLES |
|---|---|
| (A) Coelenterata | Hydra |
| (B) Platyhelminthes | Tapeworm |
| (C) Echinodermata | Starfish |
| (D) Mollusca | Snail |

## V ANSWER VERY BRIEFLY.

**1. Define Taxonomy**

Taxonomy is the science of classification which makes the study of wide variety of organisms easier and helps us to understand the relationship among different group of animals.

**2. What is nematocyst?**

Nematocyst are found in phylum Coelenterata (jelly fish).They are also called as cnidoblast. These are the specialized stinging cells found in the tentacles of jelly fish

**3. Why Coelenterates are called diploblastic animals?**

The animals in phylum coelenterates have two layers the outer ectoderm and the inner endoderm in the body wall. So they are called diploblastic animals.

**4. List the respiratory organs af amphibians.**

The respiratory organs of amphibians are gills, lungs, skin and Bucco - Pharynx.

**5. How does locomotion take place in starfish?**

In starfish Locomotion takes places by tube feet.

**6. Are jellyfish and starfish similar to fishes? If no justify the answer.**

No. Jelly fish and starfish are invertebrates Jelly fish belongs to phylum coelenterata star fish belongs to phylum invertebrata.Fishes are vertebrate belong to the class pisces.

**7. Why are frogs said to be amphibians?**

The frogs have dual adaptation in land and aquatic environments. So they are called amphibians.

## VI ANSWER BRIEFLY.

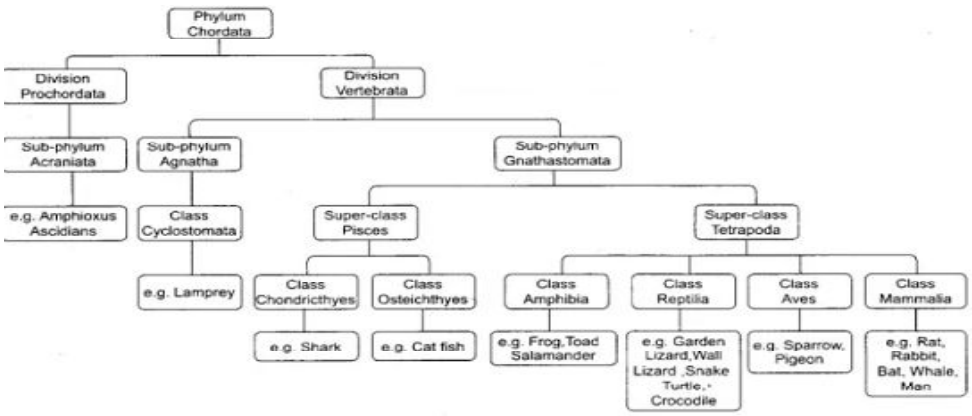
**1. Give an account on phylum Annelida.**

* The animals in phylum annelida are segmented worms.
  Example: Earth worms, Leeches and a group of marine worms.
* Segmented body shows metamerism which means the property of having repeated homologous organs in each segment.
* The animals possess body cavity called coelom.
* Some organisms show movable bristles called setae.
* They have no legs and no hard skeleton.
* The body is covered by moist outer cuticle.
* A thick multi-layered structure, outside the epidermis provides protection.
* They have a central nervous system with a brain.
* Metabolic wastes are removed by Nephridia.

**2. Differentiate between flatworms and round worms**

| FLATWORMS | ROUNDWORMS |
|---|---|
| a)The flatworms come under phylum Platyhelminthes. | .The roundworms come under phylum Nematoda |
| .b)Flatworms have a dorsoventrally flattened body. | Roundworms have cylindrical body with tapering at one end. |
| c)Flatworms do not have cuticle. | Roundworms have an outer covering called cuticle. |
| d) Flatworms are parasitic in nature. | Roundworms live either in water or in soil. |
| e) Excretion occurs with the help of Flame cells | Excretion occurs through body wall |

**3. Outline the flow charts of phylum chordata .**



**4. List five characteristic features of fishes.**

* Fishes are poikilothermic, whose internal temperature varies, considerably.
* Their body is covered by scales.
* Body muscles are arranged into segments called myotomes.
* The body is differentiated into head, trunk and tail.
* Respiration is done by 5 to7 pairs of gills, which are covered by an operculum or sometimes may be naked.

**5. Comment on the aquatic and terrestrial habits of amphibians.**

* The transition from aquatic to terrestrial living is clearly indicated in Amphibian.
* They are the first vertebrates to live on land.
* Amphibians have dual adaptation to living in aquatic and land environments.
* The double life is called amphibious.
* In frogs, the hind limbs have webbed feet.
* The skin is moist and glandular usually without scale.
* Respiration is by gills, lungs, skin and pharyngeal region.
* The heart has three chambers, with two auricles and a single ventricle.
* Fertilization is external.
* The larva is a tadpole, which is metamorphosis into an adult.

**6. How are the limbs of the birds adapted for avian life?**

* Birds have spindle-shaped body.
* The forelimbs are modified as wings for aerial locomotion.
* The air sacs present in the birds, make the bird lightweight.
* The body is covered with feathers.

## VII ANSWER IN DETAIL.

**1. Describe the characteristic features of different prochordates.**

* They are Bilateral symmetrical ( body can be divided into two equal similar halves by a single plane.)
* They are triploblastic animals as three layers are present in them namely ectoderm, mesoderm and endoderm.
* They are mostly marine animals.
* True coelom is present in them.
* Notochord is present in them.
* They don't have vertebral column.
* They don't have proper notochord at all stages of their life.
* Ventral heart is present in them.
  Ex :- Balanoglossus.
* They are divided into two groups namely :-
* Urochordata :-
  They are marine, mostly sessile, filter feeding animals.Ex :- Tadpole.
* Cephalochordata :-
  They are also marine, filter feeding in vertebrates.Ex :- Lancelet.

**2. Give an account on phylum Arthropoda**

* Arthropoda is the largest phylum
* The organisms have jointed legs.
* The body is segmented into head, thorax and abdomen.
* The exoskeleton is made up of chitin.
* The coelomic cavity is filled with haemolymph (blood).
* They do not have defined blood vessels. This is called open circulatory system.
* The insects shed the exoskeleton and this process is called moulting.
* Small Arthropods absorb oxygen through the body and larger aquatic species breathe through book gills.
* Land Arthropods breathe through a system of tiny body tubes called tracheae.
* Excretion occurs through malphigian tubules and through green glands in crabs and prawns. .
* Insects, spiders, crabs, shrimps, butterflies, millipedes, centipedes, and scorpions are some arthropods..

## UNIT-18 ORGANIZATION OF TISSUES

### I. CHOOSE THE CORRECT ANSWER.

1. The tissue composed of living thin walled polyhedral cell is _____
   **a) Parenchyma** b) Collenchyma
   c) Sclerenchyma d) None of above
2. The fibres consists of _____
   a) Parenchyma **b) Sclerenchyma** c) Collenchyma d) None of above
3. Companion cells are closely associated with _____
   **a) Sieve elements** b) Vessel elemnets c) trichomes d) Guard cells
4. Which of the following is a complex tissue ?
   a) Parenchyma b) Collenchyma **c) Xylem** d) Sclerenchyma
5. Aerenchyma is found in _____
   a) epiphytes **b) hydrophytes** c) halophytes d) xerophytes
6. Smooth muscles occur in
   a) uterus b) artery c) vein **d) All of the above**
7. Nerve cell does not contains
   a) axon b) nerve endings **c) tendons** d) dendrites
8. Non straited muscles are found in _____
   a) blood vessels b) gastric glands c) urinary bladder **d) all of those**
9. The matrix of the bone is rich in _____
   a) elastin b) reticular fibres **c) collagen** d) myosin
10. Bouquet stage refers to _____
    a) diakinesis **b) leptotene** c) zygotene d)pachytene

### II FILL IN THE BLANKS.

1. _____ tissues provide mechanical support to organs.**( Collenchyma)**
2. Parenchyma , Collenchyma , Sclerenchyma are _____ type of tissues **(simple)**

3. _____ and _____ are complex tissues **.(xylem , pholem )**
4. Epithelial cells with cilia are found in _____of our body **( trachea)**
5. Lining of small intestine is made up of _____ **(Columnar epithelium )**
6. The word meristem is derived from a greek word _____**(Meristos)**
7. In apple, Paranchyma stores _____**(sugar)**
8. Mitosis was discovered by _____ **(Flemming).**
9. _____ is a non - flexible skeletal connective tissue.(**Bone)**
10. _____ epithelium is seen in sweat glands(**Cuboidal)**

## III MATCH THE FOLLOWING.

| | | | |
|---|---|---|---|
| 1. | Sclereids | - | Sclerenchyma |
| 2. | Chloroplast | - | Chlorenchyma |
| 3. | Simple tissue | - | Collenchyma |
| 4. | Companion cell | - | Pholem |
| 5. | Trachieds | - | Xylem |

## IV STATE WHETHER TRUE OR FALSE. IF FALSE ,WRITE THE CORRECT STATEMENT.

1. Epithelial tissue is protective tissue in animal body - **True**
2. Bone and Cartilage are two types of areolar connective tissues - **False**
   **Correct Statement:** Bone and cartilage are two types of supportive connective tissue.
3. Parenchyma is a simple tissue - **True**
4. Pholem is made up of tracheids - **False**
   **Correct Statement:** Xylem is made up of tracheids.
5. Vessels are found in collenchyma - **False**
   **Correct Statement**: Vessels are found in xylem.

## V ANSWER BRIEFLY.

**1. What are intercalary meristems? How do they differ from other meristems?**

* It lies between the region of permanent tissues and is part of primary meristem. It is found either at the base of leaf. e.g. pinus or at the base of internodes eg.grasses.
* Intercalary meristem is detached and present inbetween permanent tissue.
* Apical and lateral meristem are not detached.

**2. What is complex tissue? Name the various kinds of complex tissues.**

* Complex tissues are made of more than one type of cells that work together as a unit.
* Complex tissues consist of parenchyma and sclerenchyma cells.
* Common examples are xylem and pholem

**3. Mention the most abundant muscular tissue found in our body. State its function.**

Skeletal Muscle Function

These muscles are attached to the bones and are responsible for the body movements.

They work under our control and are also known as voluntary muscles.

4. **What is Skeletal Connective tissue? How is it helpful in the functioning of our body?**

   Supportive or skeletal connective tissues forms the endoskeleton of the vertebrate body.

   They support the body, protect various organs and help in locomotion.

5. **Why should gametes be produced by meiosis during sexual reproduction?**

   The constant number of chromosomes in a given species is maintained by meiotic division.

6. **In which stage of mitosis the chromosomes align in an equatorial plane? How?**

* The duplicated chromosomes arrange on the equatorial plane at Metaphase.
* Each chromosome gets attached to a spindle fibre by its centromere.Which is known as the chromsomal fibre.

## VI ANSWER IN DETAIL.

1. **What are permanent tissues? Describe the different types of simple permanent tissues.**

**Permanent tissues.**

* Permanent tissues are those in which, growth has stopped either completely or for the time being.
* At times, they become meristematic partially or wholly. Permanent tissues are of two types, namely: simple tissue and complex tissue.

**A SIMPLE TISSUES.**

* Simple tissue are homogeneous-composed of structurally and functionally similar cells.

  Eg. Parenchyma, Collenchyma and Sclerenchyma.

**Parenchyma.**

* Parenchyma are simple permanent tissue composed of living cells.
* Parenchyma cells are thin walled, oval, rounded or polygonal in shape with well developed spaces among them.
* Parenchyma may store water in many succulent and xerophytic plants.
* It also serves the functions of storage of food reserves, absorption, buoyancy, secretion etc.,

**Collenchyma.**

* Collenchyma is a living tissue found beneath the epidermis.
* Cells are elongated with unevenly thickened non-lignified walls. Cells have rectangular oblique or tapering ends and persistent protoplast.
* They posses thick primary non-lignified walls.
* They provide mechanical support for growing organs.

**Sclerenchyma**

* Sclerenchyma consists of thick walled cells which are often lignified.
* Sclerenchyma cells do not possess living protoplasts at maturity. Sclerenchyma cells are grouped into Fibres and Sclereids

**Fibres:**

Fibres are elongated sclerenchymatous cells, usually with pointed ends. Their walls are lignified fibres are abundantly found in many plants. Eg: Jute

**Sclereids:**

Sclereids are widely distributed in plant body. They are usually broad, may occur in single or in groups.

**2. Write about the element of Xylem.**

* Xylem is a conducting tissue which conducts water, mineral nutrients upward from root to leaves.
* Xylem gives mechanical support to the plant body.
* Xylem is composed of Xylem tracheids, Xylem fibres, Xylem vessels and Xylem parenchyma

**Xylem Tracheids:**

* They are elongated or tube- like dead cells with hard, thick and lignified walls.
* Their ends are tapering, blunt or chisel- like and are devoid of protoplast.
* Their function is conduction of water and providing mechanical support to the plant.

**Xylem Fibres.**

* These cells are elongated, lignified and pointed at both the ends.
* Xylem fibres provide mechanical support to the plant.

**Xylem Vessels**

* These are long cylindrical, tube like structures with lignified walls and wide central lumen.
* Their main function is transport of water and minerals from root to leaf, and also to provide mechanical strength.

**Xylem Parenchyma.**

* These are living and thin walled cells.
* The main function of xylem parenchyma is to store starch and fatty substances.

**3. List out the differences between Mitosis and Meiosis.**

| S.NO | MITOSIS | MEIOSIS |
|---|---|---|
| 1 | Occurs in somatic cells. | Occurs in reproductive cells |
| 2 | Involved in growth and occurs continuously throughout life | Involved in gamete formation only during the reproductive active age |
| 3 | Consists of single division | Consists of two divisions |
| 4 | Two diploid daughter cells are formed | Four haploid daughter cells are formed |
| 5 | The chromosome number in the daughter cell is similar to parent cell (2n) | The chromosome number in the the daughter cell is just half (n) of the parent cell |
| 6 | Identical daughter cells are formed | Daughter cells are not similar to the parent cell and are randomly assorted |

## VII. HIGHER ORDER THINKING SKILLS.

1. **What is the consequence that occur if all blood platelets are removed from the blood?**
   Blood platelets play a major role in clotting of blood whenever there is a wound/ injury. If blood platelets are removed from the blood, clotting of blood will not occur.
2. **Which are not true cells in the blood? Why?**
   Red blood cells or erythrocyte cannot be considerd as true cells since they have a nucleus only in the early stages. A mature RBC lacks a nucleus which is the controlling centre of all living cells.

# UNIT 19 PLANT PHYSIOLOGY

## I.CHOOSE THE CORRECT ANSWER.

1. The tropic movement that helps the climbing vines to find a suitable support is_____
   a) phototropism b )geotropism **c) thigmotropism** d) chemotropism
2. The chemical reaction occurs during photosynthesis is _____
   **a) $CO_2$ is reduced and water is oxidised**
   b) water is reduced and $CO_2$ is oxidised
   c) both $CO_2$ and water are oxidized
   d) both $CO_2$ and water are produced
3. The bending of root of a plant in response to water is called _____
   a) Thigmonasty b) Phototropism
   **c) Hydrotropism** d) Photonasty
4. A growing seedling is kept in the dark room. A burning candle is placed near it for a few days. The tip part of the seedling bends towards the burning candle. This is an example of _____
   a) Chemotropism b) Geotropism
   **c) Phototropism** d) Thigmotropism
5. The root of the plant is _____
   i) positively phototropic but negatively geotropic
   ii) positively geotropic but negatively phototropic
   iii) negatively phototropic but positively hydrotropic
   iv) negatively hydrotropic but positively phototropic
   a) (i) and (ii) **b) (ii) and (iii)**
   c) (iii) and (iv) d) (i) and (iv)
6. The non-directional movement of a plant part in response to temperature is called _____
   a) Thermotropism **b) Thermonasty**
   c) Chemotropism d) Thigmonasty
7. Chlorophyll in a leaf is required for _____
   **a) photosynthesis** b) tropic movement
   c) transpiration d) nastic movement

8. Transpiration takes place through _____
   a) fruit  b) seed  c) flower  **d) stomata**
9. The plant part which exhibite negative geotropism is_____
   a) root  **b) stem**  c)branch  d) leaves
10. During photosynthesis plants exhale___
    a) Carbon dioxider  **b) Oxygen**  c) Hydrogen  d) Helium

## II. FILL IN THE BLANKS.

1. The shoot system grows upward in response to _____. **(Sun light)**
2. _____ is positively hydrotropic as well as positively geotropic. (**Root**)
3. The green pigment present in the plant is _____ .(**chlorophyll)**
4. The solar tracking of sunflower in accordance with the path of sun is due to _____.**(photonasty)**
5. The response of a plant part towards gravity is **_____. (Geotropism)**
6. Plants take in carbondioxide for photosynthesis but need **_____** for their living (**Oxygen)**
7. The raw material for photosynthesis are **_____. (Carbon dioxide and water)**
8. Heliotropism is kind of _____ **(phototropism)**
9. Plants exchange gases **_____**continuously through these stomata. (**$CO_2$ and $O_2$)**
10. In leaves , the food is stored in the form of _____. **(starch)**

## III. MATCH COLUMN A WITH COLUMN B.

| **COLUMN A** | | **COLUMN B** |
|---|---|---|
| 1. Roots growing downwards into soil | - | Positive geotropism |
| 2. Shoots growing towards the lights | - | Positive phototropism |
| 3. Shoots growing upwards | - | Negative geotropism |
| 4. Roots growing downwardsaway from light | - | Negative phototropism |

## IV.STATE WHETHER TRUE OR FALSE.IF FALSE CORRECT THE STATEMENT.

1. The response of a part of plant to the chemical stimulus is called phototropism. - **False**
   **Correct statement**: The response of plant part to the chemical stimulus is called chemotropism
2. Shoot is positively phototropic and negatively geotropic. - T**rue**
3. When the weather is hot, water evoporates lesser which is due to opening of stomata - **False**
   **Correct statemen**t : When the weather is hot,water evaporates more which is due to opening of stomata.
4. Photosynthesis produces glucose and carbon dioxide- **False**
   **Correct statement**: Photosynthesis produces glucose and oxygen
5. Photosynthesis is important in releasing oxygen to keep the atmosphere is balance- **True**
6. Plants lose water when the stomata on leaves are closed**-False**
   **Correct statement**: Plants lose water when the stomata on leaves are opened.

**V.ANSWER VERY BRIEFLY.**

1. **What is nastic movement ?**
   Nastic movement are non-directional response of the plant to stimulus
2. **Name the plants parts**

   **a) Which bends in the direction on gravitty but always from the light**
   Root

   **b).Which bends towards light but away from the force of gravity**
   Shout.
3. **Differentiate phototropism from photonasty**

| S.No | PHOTOTROPISM | PHOTONASTY |
|---|---|---|
| 1 | The unidirectional movement of a plant part to light stimulus is called phototropism. It is slow and irreversible. | The non directional movement of a plant part in response to light is called Photonasty. It is immediate, temporary and reversible |

4. **Photosynthesis converts energy X into energy Y.**

   **a) What are X and Y ?**
   X ---- light energy  Y ---- chemical energy

   **b) Green plants are autotropic in their mode plants of nutrition why ?**
   Green plants are autotropic in their mode of nutrition because they prepare their own food materials through a process called photosynthesis.
5. **Define transpiration.**
   Transpiration is the process by which plants release water vapour into the atmosphere through stomata in leaves and stems.
6. **Name the cell that surrounds the stoma**
   Guard cells.

**VI. ANSWER BRIEFLY:**

1. **Give the technical terms for the following**

   **a)Growth dependent movement in plants.**
   Tropic Movement.
   **b)Growth independent movement in plants**
   Nastic Movement.
2. **Explain the movement seen in Pneumatophores of Avicennia.**
   The movement seen in pneumatophores of Avicennia is negatively geotropicroots. These roots turn $180^0$ upright for respiration.

**3. Fill in the blanks**

$6CO_2$ + ____ $\xrightarrow[\text{Chlorophyll}]{\text{Sunlight}}$ ____ $+6O_2$ -

$6CO_2 + 6H_2O \xrightarrow[\text{Chlorophyll}]{\text{Sunlight}} C_6H_{12}O_6 + 6O_2 \uparrow$

**4. What is chlorophyll ?**

Chlorophyll is a green pigment present in all the green plants which is responsible for the absorption of light to provide energy for photosynthesis.

**5. Name the part of plant which shows positive geotropism. Why ?**

* Roots shows postive geotropism.
* Roots are the parts of a plants which are responsible for anchoring the plants firmly in the soil and helping them to hold the soil.
* Further the roots are responsible for absorbing water and mineral salts from the soil and sending it to the leaves to help in photosythesis and growth deep down into the soil and arepositively geotropic.

**6. What is the difference between movement of flower in sunflower plant and closing of the leaves in the Mimosa pudica ?**

**Movement of flower in sunflower plants:**

In sunflower plants the stem tip follows the path of the sun from dawn to dusk (east to west) and in the night it moves from west to east.This is a growth movement and takes place in response to the stimulus 'light; it is example of tropic movement in response to light and is called phototropism.

**Closing of the leaves in the Mimosa pudica:**

The closing of leaves in mimosa pudica occurs in resposnse to touch,It is not a growth movement and occurs independent of the direction of stimulus.This is nastic movement and iscalled Thigmonasty.

**7. Suppose you have a rose plant growing in a pot, how will you demonstrate transpiration in it ?**

* Take a plastic bag and tie it over a leaf of rose plant and place the plant in the sunlight.
* After some time we can see water condensing inside the plastic bag.This has been let out by the leaves and is called transpiration.

**8. Mention the difference between stomatal and lenticular transpiration.**

| STOMATAL TRANSPIRATION | LENTICULAR TRANSPIRATION |
|---|---|
| Loss of water from plants through stomata. | Loss of water from plants as vapour through the lenticels.. |
| 90-95% of transpiration in a plant takes place through stomata only | A very small percentage of water is loss by plants through lenticular transpiration |

**9. To which directional stimuli do a) roots respond - b) shoots respond ?**

a) Roots respond to gravity.

b) Shoots respond to light.

## VII. ANSWER IN DETAIL.

**1.Differentiate between Tropic and Nastic movements.**

| S.N-o | TROPIC MOVEMENTS | NASTIC MOVEMENTS |
|---|---|---|
| 1 | Unidirectional response to the stimulus | Non-directional response to the stimulus |
| 2 | Growth dependent movements | Growth independent movements |
| 3 | More or less permanent and irreversible | Temporary and reversible |
| 4 | Found in all plants | Found only in a few specialized plants |
| 5 | Slow action | Immediate action |

**2. How will you differentiate the different types of transpiration ?**

There are three types of transpiration

* **Stomatal transpiration**.
  Loss of water from plants through stomata. It accounts for 90-95% of the water transpired from leaves.
* **Cuticular transpiration.**
  Loss of water in plants through the cuticle.
* **Lenticular transpiration.**
  Loss of water from plants as vapour through the lenticles . The lenticles are tiny openings that protrude from the barks in woody stems and twigs as well as in other plants organs.

## VIII. HIGHER ORDER THINKING SKILLS

**1. There are 3 plants A, B, and C. The flowers of A open their petals in bright light during the day but closes when it gets dark at night.On the other hand,the flowers of plant B open their petals at night but closes during the day when there is bright light.The leaves of plants C fold up and droop when touched with finger or any other solid object.**

**a) Name the phenomenon shown by the flowers of plants A and B.**

Photonasty.

**b) Name one plant each which behaves like the flower of plant A and B.**

Flower A - Common Dandelion.

Flower B - Moon flower.

**c) Name the phenomenon exhibited by the leaves of plant C.**

Thigomonasty.

2. **Imagine that students A studied the imporatnce of certain factors in photosythesis. He took a potted plant and kept in the dark for 24 hours. In the early hours of the next morning, he covered one of the leaves with dark paper in the centre only. Then he placed the plant in sunlight for a few hours and tested the leaf which was covered with black paper for starch.**

a) **What aspect of photosythesis was being investigated ?**
To show that sunlight is essential for photosynthesis.

b) **Why was the plant kept in the dark before the experiment ?**
To de - starch its leaves.

c) **How will you prove that starch is present in the leaves ?**
Through Iodine test.

## UNIT 20 ORGAN SYSTEM IN ANIMALS

### I.CHOOSE THE CORRECT ANSWER :

1. Which of the following is not a salivary gland?
   a) Sublingual **b) Lachrymal** c)Submaxillary d) Parotid
2. Stomach of human beings mainly digests _____.
   a) Carbohydrates **b) proteins** c) fat d) sucrose
3. To prevent the entry of food into the trachea, the opening is guarded by _____.
   **a) epiglottis** b) glottis c) hard palate d) soft palate
4. Bile helps in the digestion of
   a) proteins b) sugar **c) fats** d) carbohydrates
5. The structural and functional unit of the kidney is _____.
   a) villi b) liver **c) nephron** d) ureter
6. Which one of the following substance is not a constituent of sweat?
   a) Urea **b) Protein** c) Water d) Salt
7. The common passage meant for transporting urine and sperms in male is _____.
   a) ureter **b) urethra** c) vas deferens d) scrotum
8. Which of the following is not a part of female reproductive system?
   a) Ovary b) Uterus **c) Testes** d) Fallopian tube
9. Lysozyme is seen in_____
   a) Gastric juice b) Intestinal juice c)Bible **d) Saliva**
10. _____ is the smallest gland.
    a) Pancreas **b) Sublingual** c)Parotid d)Sub-maxillary

### II. FILL IN THE BLANKS.

1. The opening of the stomach into the intestine is called **____ (pylorus)**
2. The muscular and sensory organ which helps in mixing the food with saliva is **____ (tongue)**
3. Bile, secreted by liver is stored temporarily in _____. **(gall bladder)**
4. The longest part of alimentary canal is **____ (Small Intestine)**
5. The human body functions normally at a temperature of about ____. **(37°C)**

6. The largest cell in the human body of a female is _____. **(ovum)**
7. _____ is the smallest cell in males. (**Sperm)**
8. One mature ovum is released once in every ____ days. (**28)**
9. Tubular filtrate finally known as _____. **(urine)**
10. The process of formation of ova is known as ____ .(**Oogenesis**)

**III. STATE WHETHER TRUE OR FALSE.IF FALSE CORRECT THE STATEMENT.**

1. Niltric acid in the stomach kills micro organism in the food. - **False**
   **Correct statement :** Hydrochloric acid in the stomach kills micro - organisms in the food.
2. During digestion,proteins are broken down into amino acids. -**True**
3. Glomerulus filterate consists of many substances like amino acids,vitamins, hormones, salts,glucose and other essential substance. - **True**

**IV. MATCH THE FOLLOWING.**

1. Skin - Sweat
2. Lungs - Carbon di oxide
3. Intestine - Undigested food
4. Kidneys - Urine

**V. DIFFERENTIATE THE FOLLOWING TERMS.**

**a) Excretion and Secretion**

**b) Absorption and Assimilation**

**c) Ingestion and Egestion**

**d) Diphyodont and Heterodant**

**e) Incisors and Canines**

| **a) EXCRETION** | **SECRETION** |
|---|---|
| The process of removal of Nirogeneous wastes generated from the body is called execretion | The process by which substance are produced and discharged from a cell, gland. or organ for a particular function in an organism. |
| **b) ABSORPTION** | **ASSIMILATION** |
| Absorption is the process by which nutrients obtained after digestion are absorbed by villi and circulated throughtout the body by blood and lymph and supplied to all body cells according to their requirements | Assimilation means the incorporation of the obsorbed food material into the tissue cells as their internal and homogenous component |
| It takes place in the small intestine | It takes place in the cells of the body |
| **c) INGESTION** | **EGESTION** |
| The process of nutrition begins with intake of food, called ingestion | The undigestied or unassimilated portion of the ingested food material is thrown out from the body through the anal operature as faccal matter.This is known as egestion or defaccation |

| d) DIPHYODONT | HETERODONT |
|---|---|
| In human beings two sets of teeth are developed in their life time. The first appearing set of 20 teeth called temporary or milk teeth are replaced by the second set of thirty two permanent teeth.sixteen in each jaw.This is called Diphyodont dentition | Permanent teeth are of four types according to their structure and function namely Incisors ,Canines ,Premolars and molars.This is called Heterodant dentiton |
| **e) INCISORS** | **CANINES** |
| Used for cutting and biting | Used for tearing and piercing |
| In a human adult there are 8 incisors | In a human adult there are 4 canines |

## VI. ANSWER BRIEFLY.

**1. How is the smallest intestine designed to absorb digested food ?**

Small intestine contains minute finger like projections called villi where absorption of food take place. The small intestine serves both for digestion and absorption.

**2. Why do we sweat ?**

* The human body functions normally at a temperature of about 37° C.
* When it gets hot sweat glands start secreting sweat.

**3. Mention any two vital functions of human kidney.**

* Maintains the fluid and electrolytes balance in our body.
* Regulate acid-base balance of blood.

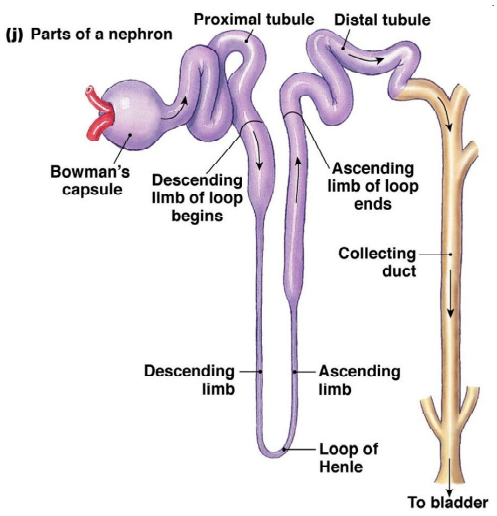
**4. What is micturition ?**

When the urinary bladder is full the urine is expelled out through the urethra.This process is called micturition.

**5. Name the types of teeth present in an adult human being. Mention the function of each.**

| TYPES OF TEETH | NUMBERS OF TEETH | FUNCTIONS |
|---|---|---|
| Incisors | 8 | Cutting and biting |
| Canines | 4 | Tearing and piercing |
| Premolar | 8 | Crushing and grinding |
| Molar | 12 | Crushing, Grinding and mastication |

**6. Explain the structure of Nephron.**




i). Each kidney consists of more that one million nephrons.

* Each nephron consist of Renal corpuscle or Malphigian corpuscle and renal tubule.
* The renal corpuscle consists of a cup-shaped structure called Bowman's capsule containing a bunch of capillaries called glomerulus.
* The Bowman's capsule continues as the renal tubule which consists of three regions proximal convoluted tubule , U shaped hair pin loop, the loop of Henle and the distal convoluted tubule.
* The distal convoluted tubule opens into the collectiong tubule

## VII. ANSWER IN DETAIL

**1. Describe the alimentary canal of man**

Alimentary canal is a muscular coiled , tubular structure. It consist of mouth, buccal cavity, pharynx, oesophagus, stomach, small intestine, large intestine and anus.

**MOUTH:**

* The mouth leads into the buccal cavity.
* It is bound by two soft movable upper and lower lips. The jaws bear teeth.

**TEETH**:

* Teeth are hard structures meant for holding cutting, grinding and crushing the food.

**SALIVARY GLANDS.**

* Three pairs of salivary glands are present in the mouth cavity. They are Parotid glands, Sublingual glands and Submaxillary or Submandibular glands.
* The salivary glands secrete a viscous fluid called saliva.

**TONGUE:**

* The tongue is a muscular, sensory organ which helps in mixing the food with the saliva.
* The masticated food in the buccal cavity becomes a bolus which is rolled by the tongue and passed through pharynx into the oesophagus by swallowing.

**PHARYNX**.

* It is a membrane lined cavity behind the nose and mouth, connecting them to the oesophagus.
* It serves as a pathway for the movement of food from mouth to oesophagus.

**OESOPHAGUS.**

* Oesophagus or the food pipe is a muscular-membranous canal about 22 cm in length.
* It conducts food from pharynx to the stomach by peristalsis movement.

**STOMACH.**

* The stomach is a wide J-shaped muscular organ located between oesphagus and the small intestine.
* The gastric glands present in the inner walls of the stomach secrete gastric juice.
* The gastric juice is colourless, highly acidic, containing mucus, hydrochloric acid and enzymes rennin (in infants) and pepsin.

**SMALL INTESTINE.**

* The small intestine is the longest part of the alimentary canal.
* It comprises three parts -

**Duodenum** is C-shaped and receives the bile duct (from liver) and pancreatic duct (from pancreas).

**Jejunum** is the middle part of the small intestine. It is a short region of the small intestine. The secretion of the small intestine is intestinal juice which contains the enzymes like sucrase, maltase, lactase and lipase.

**Ileum** forms the lower part of the small intestine and opens into the large intestine. Small intestine contains minute finger like projections called villi where absorption of food take place.

The small intestine serves both for digestion and absorption.

**LIVER.**

It is the largest digestive gland of the body, reddish brown in colour. It secretes bile juice.

**PANCREAS:**

It is a lobed, leaf shaped gland situated between the stomach and duodenum

**LARGE INTESTINE.**

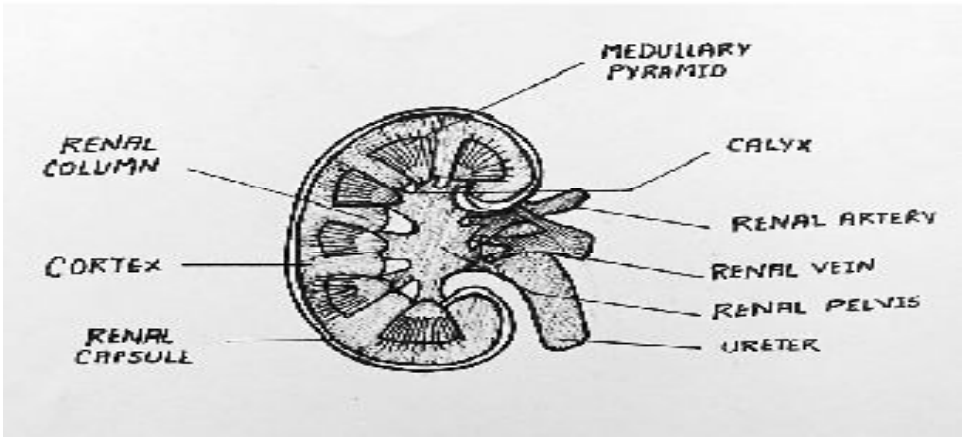
The unabsorbed and undigested food is passed into the large intestine.

It extends from the ileum to the anus.

It is about 1.5 meters in length. It has three parts- caecum, colon and rectum.

**2. Explain the structure of kidney and the steps involved in the formation of urine.**

* The kidney consists of an outer dark region, the cortex and an inner lighter region, the medulla. Both of these regions contain uriniferous tubules or nephrons.
* The medulla consists of multitubular conical massers called the medullary pyramids or renal pyramids whose bases are adjacent to cortex.
* On the inner concave side of each kidney a notch called hilum is present through which blood vessels and nerves enters in and the urine leaves out.




**Mechanism of Urine Formation:**

The process of urine formation includes the follwoing three stages

* Glomerular filtration
* Tubular reabsorption
* Tubular secretion

**Glomerular filtration.**

Urine formation begins with the filtration of blood through epithelial wall of the glomerulers and Bowman's capsule.

The filtrate is called as the glomerulus filtrate.Both essential and non-essential substances present in the blood are filtered.

**Tubular reabsorption:** The filtrate in the proximal tubule consists of essential substances such as glucose, aminoacids, vitamins, sodium, potassium bicarbonates and water that are reabsorbed into the blood by a process of selective reabsorption.

**Tubular Secretion:** Substances such as $H^+$ or $K^+$ ions are secreted into the tubule. This tubular filtrate is finally known as urine, which is hypertonic in man.

## VIII ASSERTION AND REASON TYPE QUESTIONS.

**Mark the correct answer as:**

a. If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
b. If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
c. If Assertion is true but Reason is false.
d. If both Assertion and Reason are false.

**1. Assertion:** Urea is excreted out through the kidneys.

**Reason:** Urea is a toxic substance.

**(a).If both Assertion and Reason are true and Reason is the correct explanation of Assertion.**

2. **Assertion:** In both the sexes gonads perform dual function.

   **Reason:** Gonads are also called primary sex organs.
   **(b).If both Assertion and Reason are true but Reason is not correct explanation of Assertion.**

## IX HIGHER ORDER THINKING SKILLS.

1. **If pepsin is lacking in gastric juice, then which even in the stomach will be affected?**
   (a) digestion of starch into sugars
   **(b) breaking of proteins into peptides**
   (c) digestion of nucleic acids.
   (d) breaking of fats into glycerol and fatty acids.
   (d) breaking of proteins into peptides.

2. **Name the blood vessel that (a) enter malphigian capsule and (b) leaves malphigian capsule.**

   **(a) enter malphigian capsule** - Afferent arterioles

   (**b) leaves malphigian capsule** - Efferent arterioles

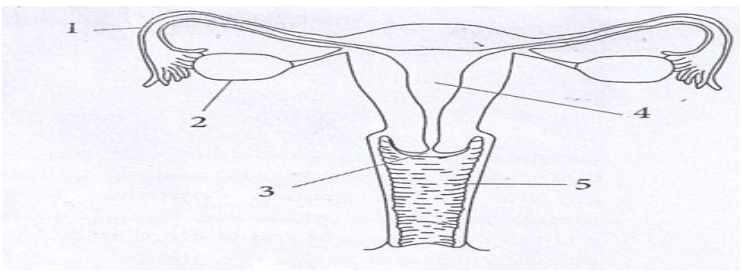
3. **Why do you think that urine analysis is an important part of medical diagnosis?**
   Urine analysis is commonly used to diagnose a urinary tract or kidney infection, to evaluate causes of kidney failure, to screen for progression of some chronic conditions such as diabetes mellitus and high blood pressure (hypertension). It also may be used in combination with other tests to diagnos some diseases.

4. **Why your doctor advises you to drink plenty of water?**
   The doctor advises to drink more water as

* Water helps to maximize physical performance.
* Hydration has a major effect on energy levels and brain function.
* Drinking water may help to prevent and treat headaches.
* Drinking more water may help relieve constipation.

5. **Can you guess why there are sweat glands on the palm of our hands and the soles of our feet ?**
   Sweating on the palm of our hands and soles of our feet is more related to mental and emotional status of an individual and not by heat.

## X MATCH THE PARTS OF THE GIVEN FIGURE WITH THE CORRECT OPTION.



| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| a. Fallopian tube | Oviduct | Uterus | Cervix | Vagina |
| b. Oviduct | Cervix | Vagina | Ovary | Vas deferens |
| c. Ovary | oviduct | Uterus | Vagina | Cervix |
| **d. Fallopian tube** | **Ovary** | **Cervix** | **Uterus** | **Vagina** |

## UNIT-21 NUTRITION AND HEALTH

### I. CHOOSE THE CORRECT ANSWER.

1. The nutrient required in trace amounts to accomplish various body functions is _____
   a) carbohydrate b) protein **c) vitamin** d) fat
2. The physician who discovered that scurvy can be cured by ingestion of citrus fruits is _____
   **a) James Lind** b) Louis Pasteur
   c) Charles Darwin d) Isaac Newton
3. The sprouting of onion and potatoes can be delayed by the process of _____
   a) freezing **b) irradiation** c) salting d) canning
4. Food and Adulteration Act was enforced by Government of India in the year _____
   a) 1964 **b) 1954** c) 1950 d) 1963
5. An internal factor responsible for spoilage of food is _____
   a) wax coating b) contaminated utensils
   **c) moisture content in food** d) synthetic preservatives
6. The maximum amount of energy provided by carbohydrate is _____
   a) 3 K cal **b) 4 K cal** c) 5 K cal d) 9 K cal
7. Pellagra is a deficiency disease, choose the vitamin related to it.
   a) Pyridoxine b) Cyanocobalamine
   **c) Niacin** d) Riboflavin
8. World Food Day is celebrated on _____
   a) 15th october b) 18th october **c) 16th october** d) 20th october
9. Sea food is a source of _____
   a) Calcium b) Potassium **c) Iodine** d) Chlorine.
10. Calcium carbide is used to _____
    a) Given colour to fruits b) preserve jams
    **c) Ripen bananas** d) Adulterant in poultry feed

### II FILL IN THE BLANKS.

1. Deficiency diseases can be prevented by taking _____ diet. **(balanced)**
2. The process of affecting the natural composition and the quality of food substance is known as _____ **(adulteration)**

3. Vitamin D is called as _____ vitamin as it can be synthesised by the body from the rays of sunlight. **(sunshine)**
4. Dehydration is based on the principle of removal of _____ **.(water)**
5. Food should not be purchased beyond the date of _____. **(expiry)**
6. AGMARK is used to certify _____ and _____ products in India. **(Agricultural , livestock)**
7. _____ is an example of monosaccharide. **(Glucose)**
8. The term vitamin was introduced by _____.**(Dr. Funk )**
9. The gas _____ is filled in airtight packets of potato wafers.**(nitrogen)**
10. Swollen and bleeding gums is a symptom of _____.**(Scurvy)**

## III STATE WHETHER TRUE OR FALSE. IF FALSE, CORRECT THE STATEMENT.

1. Iron is required for the proper functioning of thyroid gland.- **False**
   **Correct statement:** Iodine is required for the proper functioning of thyroid gland.
2. Vitamins are required in large quantities for normal functioning of the body. **- False**
   **Correct statement:** Vitamins are required in minute quantities for normal functioning of the body.
3. Vitamin C is a water soluble vitamin. - **True**
4. Lack of adequate fats in diet may result in low body weight. **- True**
5. ISI mark is mandatory to certify agricultural products. - **False**
   **Correct statement:** ISI mark is mandatory to certify industrial products.

## IV MATCH THE FOLLOWING

| | | | |
|---|---|---|---|
| 1. | Calcium | - | Osteoporosis |
| 2. | Sodium | - | Muscular cramps |
| 3. | Potassium | - | Muscular fatigue |
| 4. | Iron | - | Anaemia |
| 5. | Iodine | - | Goitre |

## V FILL IN THE BLANKS WITH SUITABLE ANSWERS.

| Vitamins | Dietary Source | Deficiency Disease |
|---|---|---|
| Calciferol | **Egg** | Rickets |
| **Retinol** | Papaya | Night blindness |
| Ascorbic acid | **Citrus fruits** | **Scurvy** |
| **Thiamine** | Whole grains | Beriberi |

## VI GIVE ABBREVIATIONS FOR THE FOLLOWING FOOD STANDARDS.

| | | | |
|---|---|---|---|
| 1. | ISI | - | Indian Standards Institution |
| 2. | FPO | - | Fruit Process Order |
| 3. | AGMARK | - | Agricultural Marketing |
| 4. | FCI | - | Food Corporation of India |
| 5. | FSSAI | - | Food Safety and Standards Authority of India. |

## VII ASSERTION AND REASON.

**Direction: In the following question, a statement of a Assertion is given and a corresponding .Reason is given just below it. Of the statements given below, mark the correct answer as:**

**a. If both Assertion and Reason are true and the Reason is the correct explanation of Assertion.**

**b. If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.**

**c. If Assertion is true but Reason is false.**

**d. If both Assertion and Reason is false.**

1. **Assertion:** Haemoglobin contains iron.
   **Reson:** Iron deficiency leads to anaemia.

**(a) If both Assertion and Reason are true and the Reason is the correct explanation of Assertion.**

2. **Assertion:** AGMARK is a quality control agency.
   **Reason:** ISI is a symbol of quality.

**(d) If both Assertion and Reason is false.**

## VIII GIVE REASON FOR THE FOLLOWING STATEMENTS.

a) Salt is added as a preservative in pickles **because it removes the moisture content in the food.**
b) We should not ear food items beyond the expiry date **because the quality of food is lost.**
c) Deficiency of calcium in diet leads to poor skeletal growth **because calcium is the main constitient of bones.**

## IX ANSWER BRIEFLY

**1. Differentiate( a) Kwashiorkar from Marasmus (b) Macronutrients from micronutrients**

| S.NO | KWASHIORKAR | MARASMUS |
|---|---|---|
| (a) 1. | Children whose diet mainly consists of carbohydrates but lack in protein | Children are affected when the diet is poor carbohydrates, fats and proteins |
| 2. | If affects children between 1-5 years of age | It usually affects the infacts below the age of one year |
| b) | **Macronutrients** | **Micronutrients** |
| 1. | Nutrients required for the growth and development of the body in large quantities are called macronutrients | Nutrients required for the growth and development of the body in small quantities are called micronutrients |
| 2. | Eg: Calcium, potassium and sodium | Eg: Iron and Iodine |

**2. Why salt is used as preservative in food?**

i) Addition of salt removes the moisture content in the food by the process of osmosis.

ii) This prevents the growth of bacteria and reduces the activity of microbial enzymes.

**3. What is an adulterant?**

The adulterant is any material which is used for the purpose of adulteration.

**4. Name any two naturally occuring toxic substance in food**

(i) Fish oil poisoning (ii) Marine toxins.

**5. What factors are required for the absorption of vitamin D from the food by the body?**

The factor that regulates the absorption of Vitamin D is the presence of dietary fat (Egg, Liver, Dairy products, Fish, etc). When our body absorbs this fat, it also absorbs the dissolved Vitamin D. When the sun rays fall on the skin, the fat is conveted to vitamin D

**6. Write any one function of the following minerals.**

**a) Calcium b) Sodium c) Iron d) Iodine**

| **Minerals** | **Function** |
|---|---|
| a) Calcium | Constituent of bones and enamel of teeth |
| b) Sodium | Maintains fluid balance |
| c) Iron | Important component of haemoglobin |
| d) Iodine | Formation of thyroid hormone |

**7. Explain any two methods of food preservation.**

**Drying:**

* Drying is the process of removal of water/moisture content in the food.
* Drying inhibits the growth of microorganism such as bacteria, yeasts and moulds.

**Smoking**

* In this process, food products like meat and fish are exposed to smoke.
* The drying action of the smoke tends to preserve the food.

**8. What are the effects of consuming adulterated food?**

Consumption of the adulterated foods may lead to serious health issues like fever, diarrhoea, nausea, vomitting, asthma, allergy, skin allergies, kidney and liver failure, colon cancer and even birth defects.

## X. ANSWER THE Detail :-

**1. How are vitamins useful to us? Tabulate the sources, deficiency diseases and symptoms of fat soluble vitamins.**

Vitamins are the vital nutrients, required in minute quantities to perform physiological and biochemical functions

**Fat soluble vitamins**

| Vitamins | Sources | Deficiency disorders | Symptoms |
|---|---|---|---|
| **Vitamin A** (Retinol) | Carrot, papaya, leafy vegetables, fish liver oil, egg yolk, liver, dairy products | Xerophthalmia Nyctalopia (Night blindness) | Dryness of Cornea Unable to see in the night (dim light) Scaly skin |
| **Vitamin D** (Calciferol) | Egg, liver, dairy products, fish, synthesized by the skin in sunlight | Rickets (in children) | Bow legs, defective ribs, development or pigeon chest |
| **Vitamin E** (Tocopherol) | Whole wheat, meat vegetable oil, milk | Sterility in rats Reproductive abnormalities | Sterility |
| **Vitamin K** (Derivative of Quinone) | Leafy vegetables soyabeans, milk | Blood clotting is prevented | Execessive bleeding due to delayed blood clotting |

**2. Explain the role of food control agencies in India.**

Food quality control agencies

**ISI (Indian Standards Institution)** known as Bureau of Indian Standard. It Certifies Industrial products like Electrical appliances like switches, wiring cables, water heater, electric motor, kitchen appliances etc.

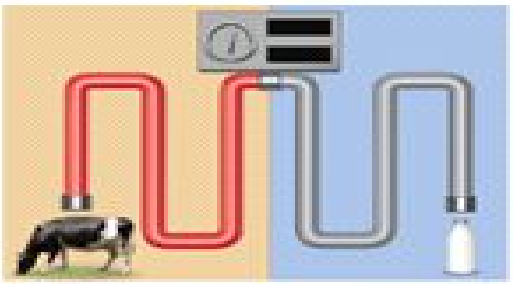
**AGMARK (Agricultural Marking)** certifies agricultural and livestock products like cereals, essential oils, pulses, honey, butter etc.

**FPO (Fruit Process Order)** certifies the fruit products like Juice, jams, sauce, canned fruits and vegetables, pickles etc.

**FSSAI ( Food Safety and Standards Authority of India)** responsible for protecting and promoting public health through regulation and supervision of food safety.

## XI HIGHER ORDER THINKING SKILLS :-

1. **Look at the picture and answer the question that follows**



a) Name the process involved in the given picture. - **Pasteurization**

b) Which diary food is preserved by this process? - **Milk**

c) What is the temperature required for the above process?

**63°c for 30 minutes followed by sudden cooling**

2. **The doctor advices an adolescent girl who is suffering from anaemia to include more of leafy vegetables and dates in her diet why so?**
   Insufficient iron can lead to anaemia. Leafy vegetables and dates are rich in iron and other minerals. So the doctor advises to include more of these in the diet.
3. **Sanjana wants to buy a jam bottle in a grocery shop. What are the things she should observe on the lable before purchasing it?**
   * Name of the product. * Manufacturer's details, Contents/Ingredients.
   * Net Weight. * Maximum Retail Price (MRP).
   * Date of Manufacture. * Date of Expiry.
   * Date of best before use.

## UNIT :22 WORLD OF MICROBES

### I. CHOOSE THE BEST ANSWER.

1. Which of the following is transmitted through air? _____
   **a) Tuberculosis** b) Meningitis c) Typhoid d) Cholera
2. One of the means of indirect transmission of a disease is _____
   a) sneezing b) coughing **c) vectors** d) droplet infection
3. Diptheria affects the _____
   a) lungs **b) throat** c) blood d) liver
4. The primary organ infected during tuberculosis is _____
   a) bonemarrow b) intestine c) spleen **d) lungs**
5. Microbes that generally enter the body through nose are likely to affect _____
   a) gut **b) lungs** c)liver d) lymph nodes
6. The organ affected by jaundice is _____
   a) **liver** b) lungs c) kidney d) brain
7. Poliomyelitis virus enters the body through _____
   a) skin **b) mouth and nose** c) ears d) eye
8. Which one of the following is a symbiotic bacteria? _____
   a) Azopirillum b) Azotobacter **c) Rhizobium** d) None of these
9. AIDS is a _____ disease
   a) Endemic b) Epideremic **c) Pandemic** d)Sporadic
10. Fever, sore throat and choking of air passage are symptons of _____
    a) influenza **b) diphtheria** c) whooping d) Typhoid

### II. FILL IN THE BLANKS.

1. _____ break down the organic matter and animal waste into ammonia **(Putrefying bacteria)**
2. Typhoid fever is caused by _____ **(Salmonella typhi)**
3. H1N1 virus causes _____ **(Swine flu)**
4. _____ is a vector of viral disease dengue. **(Aedes aegypti mosquito)**
5. _____ vaccine gives considerable protection against tuberculosis **(BCG)**
6. Cholera is caused by _____ and Malaria is caused by _____ **(Vibrio cholerae, Plasmodium)**

7. Adenovirus is _____ virus **(animal)**
8. _____ bacteria live on dead organic matter **(saprophytic**)
9. Dengue is known as _____ fever (**Break bone**)
10. The process of vaccination was introduced by _____ **(Edward jenner)**

## III. EXPAND THE FOLLOWING .

1. ORS - Oral Rehydration Solution
2. HIV - Human Immunodeficiency Virus
3. DPT - Diphtheria Pertusis Tetanus
4. WHO - World Health Organisation
5. BCG - Bacillus Calmette Guerin

## IV. PICK OUT THE ODD ONE.

1. **AIDS, Retrovirus, Lympocytes, BCG. <u>BCG</u>**
2. **Bacterial disease, Rabies, Cholera, Common cold and Influenza .<u>Cholera</u>**

## V. STATE WHETHER TRUE OR FALSE, IF FALSE, CORRECT THE STATEMENT.

1. Rhizobium, associated with root nodules of leguminous plants fixes atmospheric nitrogen- **True**
2. Non infectious diseases remain confined to the person who develops the disease and do not spread to others - **True**
3. The process of vaccination was developed by Jenner - **True**
4. Hepatitis B is more dangerous than Hepatitis A - **True**

## VI. MATCH THE FOLLOWING .

1. Swine flu - Influenza virus H1N1
2. Genital warts - Human Papilloma virus
3. AIDS - Human Immunodeficiency virus
4. Tuberculosis - Mycobacterium

## VII. DEFINE THE FOLLOWING .

1. **Pathogen.**
   A pathogen is a biological agent that causes disease due to its host Eg. Bacteria, Virus etc.
2. **Bacteriophages.**
   Virus that infect bacterial cells Eg. T4 bacteriophage.
3. **Vaccines.**
   Preparation of antigenic proteins of pathogens (weakened or killed) which on inoculation into a healthy person provides temporary/ permanent immunity against a particular disease.
4. **Prions.**
   Prions are viral particles which contain only proteins. They do not contain nucleric acid.

## VIII. ANSWER VERY BRIEFLY.

**1. Distinguish between Virion and Viroid.**

| VIRION | VIROID |
|---|---|
| Virion is a simple virus particle and can grow and multiply in living cells only | Viroid is a free pathogenic RNA of virus. |
| They are the smallest infecting agents and can live on plants, animals, human beings and bacteria | They are found in plant cells and causes diseases only in plants. |

**2 Name the vector of the malarial parasite. Mention the species of malarial parasite which cause malignant and fatal malaria**

The vector of the malarial parasite is the female Anopheles mosquito.
Malaria caused by Plasmodium falciparum is malignant and fatal.

3. **What is Triple antigen? Mention the disease which can be prevented by using the antigen.**

DPT is called triple antigen vaccine as it is a combined vaccine for protection against Diptheria, Pertusis and Tetanus

4. **Name the chronic diseases assoiciated with respiratory system?**

Chronic diseases associated with respiratory system are; Diptheria, Whooping Cough, Tuberculosis.

**5. Name the organism causing diarrhoeal disease and give one precaution against it.**

Organism : Rotavirus
Precaution : Proper sanitation and hygiene.
Aedes aegypti : Dengue Female Anopheles Mosquito - Malaria.

**6. Name two common mosquitoes and the diseases they transmit**

Anopheles mosquito and Aedes aegypti mosquito are common mosquitoes that transmit malaria, Chikungunya and Dengue.

## IX. ANSWER BRIEFLY.

**1. Give an account of classification of bacteria based on the shape.**

Bacteria are microscopic, single celled prokaryotic organisms without nucleus and other cell organelles. Although majority of bacterial species exist as single celled forms, some appear to be filaments of loosely joined cells. The size varies from less than 1 to 10 μm in length and 0.2 to 1 μm micrometer in width
Based on the shapes. bacteria are grouped into 3 types.

* Spherical based bacteria as cocci (or coccus for a single cell)
* Rod shaped bacteria called as bacilli (or bacillus for a single cell)
* Spiral shaped bacteria called as spirilla(or spirillum for single cell)

**2. Describe the role of microbes in agriculture and industries**

Microbes play an important role in agriculture as biocontrol agents and biofertilizers. Microbes play a vital role in the cycling of elements like carbon, nitrogen, oxygen, sulphur and phosphorus.

**Microbes as biocontrol agents**

* Microorganisms used for controlling harmful or pathogenic organisms and pests of plants are called as biocontrol agents (Biopesticides).
* Bacillus thuringiensis (Bt) is a species of bacteria that produces a protein called as 'cry' protein. This protein is toxic to the insect larva and kills them.

**Microbes as biofertilizers**

Microorganisms which enrich the soil with nutrients are called as biofertilizers. Bacteria, cyanobacteria and fungi are the main sources of biofertilizers. This is done by microbes either in free living conditions or by having symbiotic relationship with the plants, e.g. Nitrosomonas, Nostoc (free living), symbiotic microbes like Rhizobium, Frankia, mycorrhizae.

**Microbes in Industries**

* Microorganisms play an important role in the production of wide variety of valuable products for the welfare of human beings.
* Production of fermented beverages.

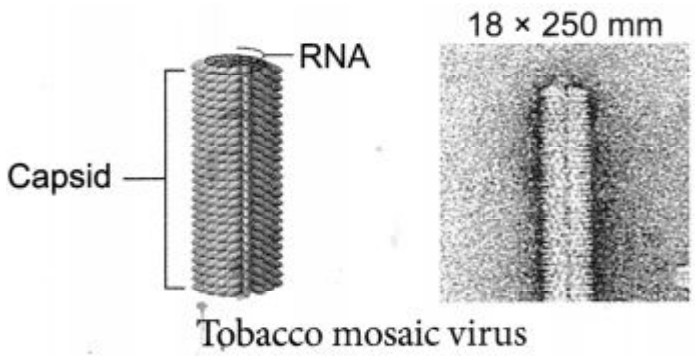
  Beverages like wine are produced by fermentation of malted cereals and fruits by Saccharomyces cerevisiae.
* **Curing of coffee beans, tea leaves and tobacco leaves:** Beans of coffee and cocoa, leaves of tea and tobacco are fermented by the bacteria Bacillus megaterium. This gives the special aroma.
* **Production of curd:** Lactobacillus sp. converts milk to curd. .
* **Production of organic acids, enzymes and vitamins:**

  Oxalic acid, acetic acid and citric acid are produced by fungus Aspergillus niger. Enzymes like lipases, invertase, proteases, and glucose oxidase are derived from microbes. Yeasts are rich source of vitamin-B complex.

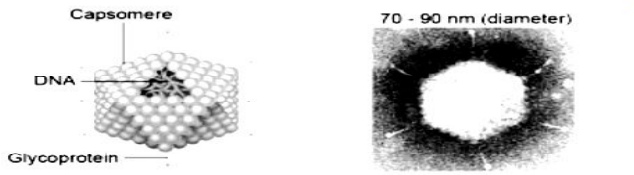
**3. Explain the various types of viruses with examples.**

Viruses are categorised as:

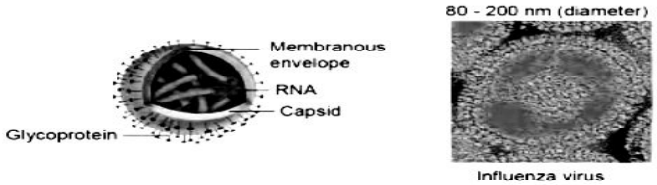
* **Plant virus**: Virus that infect plants, e.g. Tobacco mosaic virus, Cauliflower mosaic virus, Potato virus.



* **Animal virus**: Virus that infect animals, e.g. Adenovirus, Retrovirus(HIV), Influenza virus, Poliovirus.



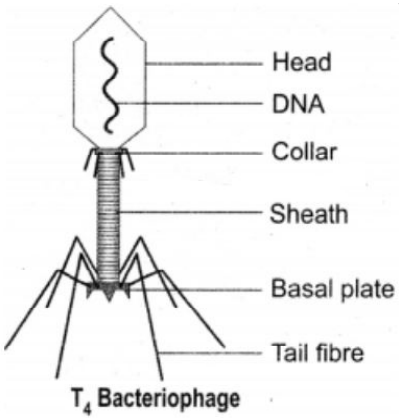

Adenovirus




Influenza virus

Animal virus

* **Bacteriophages**: Virus that infect bacterial cells, e.g. T4 bacteriophage.




$T_4$ Bacteriophage

**4. Suggest the immunization schedule for a new born baby till 12 months of age,Why it is necessary to follow the schedule?**

| Age | Vaccine | Dosage |
|---|---|---|
| New bom | BCG | 1st dose |
| 15 days | DPT and Polio | 1st dose |
| 6th week | DPT and Polio | 1st dose |
| 10th week | DPT and Polio | 1st dose |
| 14th week | DPT and Polio | 1st dose |
| 9-12 months | Measles | 1st dose |

Necessity to follow the schedule :

The immunization schedule indicates the age at which the vaccination should be to administered to protect the children from infectious diseases.

## X. ASSERTION AND REASON TYPE QUESTIONS.

Mark the correct statement as

a. If both A and R are true and R is correct explanation of A
b. If both A and R are true but R is not the correct explanation of A
c. If A is true but R is false
d. If both A and R are false

1. **Assertion:** Chicken pox is a disease indicated by scars and marks in the body
   **Reason:** Chicken pox causes rashes on face and further spreads throughout the body
   **(a) If both A and R are true and R is a correct explanation of A**
2. **Assertion: Dengue can be treated by intake of antibiotics.**
   **Reason: Antibiotics blocks the multiplication of viruses.**
   **(d) If both A and R are false**

## XI HIGHER ORDER THINKING SKILLS

1. **Suggest precautionary measures you can take in your school to reduce the incidence of infectious disease.**

   Precautionary measures that can be taken are;

* The sick student or staff can be asked to stay at home.
* Clean and disinfect classroom materials and surfaces.
* Adopt healthy practices such as safe handling of food and usage of toilets.
* Provide awareness in daily announcements about preventing spread of germs and illnesses.

2. **Tejas suffered from typhoid while, Sachin suffered from tuberculosis. Which disease could have caused more damage and why?**

* Typhoid is a food and water-borne disease which affects the intestines. There are good drugs available for its treatment. If the patient reports to the doctor on time, it can be treated safely. Typhoid vaccine is also available that can protect against further attacks.
* Whereas, Tuberculosis is a very tricky disease. Though it basically infects the lungs, it can spread to other parts of the body such as bones, intestines, etc. Another complication of TB is that, once infected, the Mycobacterium remains dormant in the body even after adequate treatment. Whenever the immunity of the patient goes down, TB can resurface again. Therefore, Tuberculosis causes more damage when compared to Typhoid.

# UNIT 23 ECONOMIC BIOLOGY

## I CHOOSE THE CORRECT ANSWER.

1. The production and management of fish is called _____
   **a) Pisciculture** b)Sericulture c) Aquaculture d)Monoculture

2. Which one of the following is not an exotic breed of cow? _____
   a) Jersey b) Holstein- Friesan **c) Sahiwal** d)Brown Swiss
3. Which one of the following is an Italian species of honey bee? _____
   **a)Apis mellifera** b) Apis dorsata c) Apis florae d) Apis cerana
4. Which one of the following is not an Indian major carp? _____
   a) Rohu b) Catla c) Mrigal **d) Singhara**
5. Drones in the honey bee colony are formed from _____
   **a) unfertilized egg** b) fertilized egg c) parthenogenesis d)both b and c
6. Which of the following is an high milk yielding variety of cow? _____
   **a) Holstein - Friesan** b) Dorset c) Sahiwal d) Red Sindhi
7. Which Indian variety of honey bee is commonly used for apiculture? _____
   a) Apis dorsata b) Apis florea c) Apis mellifera **d) Apis Indica**
8. _____ is the method of growing plants without soil
   a) Horticulture **b) Hydroponics** c)Pomology d) none of these
9. The symbiotic association of fungi and vascular plants is _____
   a) Lichen b) Rhizobium **c) Mycorhizae** d) Azotobacter
10. The plant body of mushroom is _____
    a) Spawn **b) Mycelium** c) Leaf d) All of these

## II. FILL IN THE BLANKS.

1. Quinine drug is obtained from _____ **(Cinchona officinalis)**
2. Carica papaya leaf can cure _____ disease **(Dengue)**
3. Vermicompost is a type of soil made by _____ and microorganisms **(Earthworm)**
4. _____ refers to the culture of prawns, pearl and edible oysters **(Aquaculture)**
5. The largest member in a honeybee hive is the _____ **(Queen bee)**
6. _____ is the preservative in honey **(Formic Acid)**
7. _____ is the method of culturing different variety of fish in a water body **(Polyculture)**
8. _____ is the most intensive type of vegetable growing (**Vegetable forcing**)
9. One kilogram of honey contains ___ calories (**3200)**
10. Compost is a ___ as well as a fertilizer, which is rich in nutrients.(**Soil conditioner)**

## III. SAY TRUE OR FALSE IF FALSE CORRECT THE STATEMENT.

1. Mycorrhiza is an algae - **False**
   **Correct statement:** Mycorrhiza is a fungi.
2. Milch animals are used in agriculture and transport - **False**
   **Correct statment :** Milch animals are used in production milk.
3. Apis florea is a rock bee - **False**
   **Correct statement:**Apis Florea is a little bee.
4. Ongole is an exotic breed of cattle - **False**
   **Correct statement** : Ongole is a Indian breed of cattle.
5. Sheep manure contains high nutrients than farm yard manure -**True**

## IV. DIFFERENTIATE THE FOLLOWING.

### a. Exotic breed and Indigenous breed

| Exotic breed | Indigenous breed |
|---|---|
| Exotic breeds are imported from foreign countries | Indigenous breed are native to India |
| These foreign breeds are selected for long lactation periods. | These local breed show excellent resistance to diseases. |
| Example: Jersey, Brown Swiss and Holstein-Friesian | Example: Sahiwal, Red Sindhi, Deoni and Gir. |

### b. Pollen and Nectar

| POLLEN | NECTAR |
|---|---|
| It is fine powder of microscopic particles from the male flower. Pollen is produced by anther,male reproductive organ | It is a sweet substance, produced by plants to attrat pollinators such as bee, butterfly. Nectar is converted into honey |

### c. Shrimp and Prawn

| SHRIMP | PRAWN |
|---|---|
| Marine inhibited prawns are called shrimps, which breed in deep sea | Prawn are crustaceans inhibited in fresh water, marine water, estuaries, etc. |

### d. Farmyard manure and Sheep manure

| FARMYARD MANURE | SHEEP MANURE |
|---|---|
| It is a mixture of cattle dung, urine, litter material, and other dairy wastes. | This is the manure of sheep or Goat |
| 0.5 % Nitrogen 0.2 % phosphate, 0.5% potash | 3 % Nitrigen, 1 % phosporus pentoxide 2% potassium oxide |
| Less compared to sheep manure | High nutrients |

## V. MATCH THE FOLLOWING

1. **COLUMN A** — **COLUMN B**
   1. Lobsters — Shell fish
   2. Catla — Fin fish
   3. Sea bass — Marine fish
   4. Oysters — Pearls
   5. Pokkali — Paddy

6. Pleurotus sps — Oyster mushroom
7. Sarpagandha — Reserpine
8. Olericulture — Vegetable farming
9. Wrighta tinctoria — Psoriosis

## VI ANSWER BRIEFLY:

**1. What are secondary metabolites?**

* Most medicines are obtained either directly or indirectly from plants. All the major system of medicines such as Ayurveda, Yoga, Unani, Siddha, Homeopathy (AYUSH) use drugs obtained from plants and animals.
* These drugs from medicinal plants are called secondary metabolites.

**2. What are the types of vegetable garden?**

Vegetable farming can be classified into:

* Kitchen or Nutrition gardening,
* Commercial gardening,
* Vegetable forcing.

**3. Mention any two mushroom preservation methods**

(i). Drying (ii). Freezing

**4. Enumerate the advantages of vermicimpost over chemical fertilizer.**

* It is a rich source of nutrients essential for plant growth. It makes the soil fertile.
* It improves soil structure, texture, aeration and water holding capacity and helps to prevent soil erosion.
* It contains valuable vitamins, enzymes and growth regulator substances for increasing growth, vigour and yield of plants.
* It enhances decomposition of organic matter in soil.
* Vermicompost is free from pathogens and toxic elements.
* Vermicompost is rich in beneficial microflora.

**5. What are the species of earthworm used for vermiculture?**

Perionyx excavatus (Indian blueworm), Eisenia fetida (Red worms), Eudrilus eugeniae (African night crawler).

**6. List the medicinal importance of honey**

* Honey has an antiseptic and antibacterial property. It is a blood purifier.
* It helps in building up of haemoglobin content in the blood.
* It is used in Ayurvedic and Unani system of medicines.
* It prevents cough, cold, fever and relieves sore throat.
* It is a remedy for ulcers of tongue, stomach and intestine.
* It enhances digestion and appetite.

## VII ANSWER IN DETAIL

**1. Enumerate the advantage of hydroponics.**

Hydroponics is the method of growing plants without soil, using mineral nutrient solutions in water.

**The advantages of Hydroponics**

* Conservation of water and nutrients.
* Controlled plant growth.
* In deserts and Arctic regions hydroponics can be an effective alternative method.
* Hydroponics is successfully employed for the commercial production of seedless cucumber and tomato.

**2. Define Mushroom culture, Explain the mushroom cultivation methods;**

Mushroom cultivation is a technology of growing mushrooms using plant, animal and Industrial waste.

**Major stages of mushroom cultivation are:**

* **Composting**:
  Compost is prepared by mixing paddy straw with number of organic materials like cow dung and inorganic fertilizers. It is kept at about 50°C for one week.
* **Spawning:**
  Spawn is the mushroom seed. It is prepared by growing fungal mycelium in grains under sterile conditions. Spawn is sown on compost.
* **Casing:**
  Compost is covered with a thin layer of soil. It gives support to the growing mushroom, provides humidity and helps regulate the temperature.
* **Pinning:**
  Mycelium starts to form little bud, which will develop into mushroom. Those little white buds are called pins.
* **Harvesting:**
  Mushroom grow better in 15°C – 23°C. They grow 3 cm in a week which is the normal size for harvesting. In the third week the first flush mushroom can be harvested.
* **Preservation**
  Freezing, drying, canning etc are used to increase the life of mushrooms.

**3. What are the sources of organic resources for vermicomposting?**

* Agricultural wastes (crop residue, vegetable waste, sugarcane trash)
* Crop residues (rice straw, tea wastes, cereal and pulse residues, rice husk, tobacco wastes, coir wastes)
* Leaf litter
* Fruit and vegetable wastes
* Animal wastes (cattle dung, poultry droppings, pig slurry, goat and sheep droppings)
* Biogas slurry

**4. Give an account of different types of fish ponds used for rearing fishes**

**Types of ponds for fish culture**

Fish farm requires different types of pond for the various developmental stages of fish growth. They are:

* **Breeding pond:**
  Healthy and sexually mature male and female fishes are collected and introduced in this pond for breeding.
  The eggs released by the female are fertilized by the sperm and fertilized eggs float in water as frothy mass.

* **Hatchling pits**:
  The fertilized eggs are transferred to hatching pits for hatching.
  Two types of hatching pits are hatcheries and hatching hapas.
* **Nursery ponds**:
  The hatchlings are transferred from hatching pits after 2 to 7 days.
  The hatchlings grow into fry and are cultured in these ponds for about 60 days with proper feeding till they reach 2 -2.5 cm in length.
* **Rearing ponds**:
  Rearing ponds are used to culture the fry.
  The fish fry are transferred from nursery pond to rearing ponds and are maintained for about three months till they reach 10 to 15 cm in length. In these rearing ponds the fry develops into fingerlings.
* **Stocking pond**:
  The stocking pond is also called a culture pond or production pond.
  These ponds are used to rear fingerlings upto the marketable size.
  Before releasing the fingerlings, the pond is manured with organic manure and inorganic fertilizers.

**5. Classify the different breeds of the cattle with suitable examples**

**Cattle breeds.**

The Indian cattle include cows and buffaloes. They are domesticated for milk, meat, leather and transportation. They belong to two different species, Bos indicus (Indian cows and bulls) and Bos bubalis (buffaloes). These cattle animals are reared for milk and farm labour. They are classified into three types:

* Dairy breeds,
* Draught (or) Draft breeds,
* Dual-purpose breeds

**Dairy breeds.**

Dairy animals are domesticated for obtaining milk.The dairy breeds may be i**ndigenous breeds (or) exotic breeds.**

Indigenous breeds are native of India. They include Sahiwal, Red Sindhi, Deoni and Gir. These cattle are well built with strong limbs, prominent hump and loose skin. These local breed animals show excellent resistant to diseases.

The exotic breeds (Bos taurus) are imported from foreign countries. They include Jersey, Brown Swiss and Holstein-Friesian etc.

**Draught (or) Draft breeds.**

They are used for agricultural work, such as tilling, irrigation and carting.

These include Amritmahal, Kangayam, Umblachery, Malvi, Siri and Hallikar breeds. Bullocks are good draft animals while the cows are poor milk yielders.

**Dual-purpose breeds:**

These breeds provide milk and they are useful for farm work. In India these breeds are favoured by farmers as the cows are fairly good milk yielders and bullocks are good for draught work. They includes Haryana, Ongole, Kankrej and Tharparkar.

## VIII HIGHER ORDER THINKING SKILLS.

1. **Biomanuring plays an important role in agriculture Justify.**

* Biomanure also known as organic manures, are predominantly derived from plant debris, animal faeces and microbes.
* They make the soil fertile by adding nutrients like nitrogen. They are eco-friendly.
* Biomanure is easy to generate and very economical. Some examples of biomanure are Animal manure, Vermicompost and Green Manure.

2. **Each bee hive consists of hexagonal cells. Name the material in which the cell is formed and mention the significance of the hexagonal cells.**
   The cell is formed in a sheet of wax. The hexagonal shape allows to hold the queen bee's eggs and store the pollen and honey the worker bees bring to the hive.

# UNIT 24 ENVIRONMENTAL SCIENCE

## I CHOOSE THE CORRECT ANSWER.

1. All the factors of biosphere which affect the ability of organisms to survive and reproduce are called as _____
   a) biological factors **b) abiotic factors** c) biotic factors d) physical factors
2. The ice sheets from the north and south poles and the icecaps on the mountains, get covered into water vapour through the process of _____
   a) evaporation b) condensation **c) sublimation** d) infilitration
3. The atmospheric carbon dioxide enters into the plants through the process of _____
   **a) photosynthesis** b) assimiliation c) respiration d) decomposition
4. Increased amount of _____ in the atmosphere, results in greenhouse effect and global warming
   a) carbon monoxide b) sulphur dioxide
   c) nitrogen dioxide **d) carbon dioxide**
5. Which one of the following is not abiotic factor?
   a) water b) air c) soil **d) none of those**
6. The process of water cycle that related with the plants is called _____
   a) Percolotion b) Evaporation
   **c) Transpiration** d) Precipitation.
7. Rain is due to the process of _____
   a) condensation **b) precipitation** c) sublimnation d) Runoff
8. _____ is the primary nutrient important for survival of all living organisms
   **a) Nitrogen** b) carbon c) Hydrogen d) Oxygen
9. Root caps is a characteristic adaptation of _____
   a) Xerophytes b) Hydrophytes
   **c) Mesophytes** d) All the above
10. The plant is callled a s"cindrella of the plant kingdom"?
    a) Hydrilla **b) Water hyacinth** c) Calotropis d) Aloe vera

## II FILL IN THE BLANKS.

1. IUCN was founded on _____ at Gland, Switzerland. **(5th october 1948)**.
2. There are _____ globally identified bioldiversity hotspots in india **(four)**
3. The theme for world water day 2018 is ____. (**Nature of water**)
4. Earthworms are referred as ____ **(Farmer's friend)**
5. _____ is the reverse of vapourisation.(**condensation**)
6. Atmosphere is a rich source of _____ (**Nitrogen**)
7. Carnivorous animals synthesize _____ from their food (**Protein**)
8. In bats, modified forelimbs seve as _____ (**Wings**)
9. Capacity to remain a float in liquid or gas is called ____ ( **Buoyancy)**
10. Earthworm belongs to phylum _____(**Annelida**)

## III MATCH THE FOLLOWING.

| | | | |
|---|---|---|---|
| 1. | Nitrosomonas | - | Nitrification |
| 2. | Azotobacter | - | Nitrogen fixation |
| 3. | Pseudomonas species | - | Denitirfication |
| 4. | Putrefying bacteria | - | Ammonification |

## IV SAY TRUE OR FALSE IF FALSE CORRECT THE STATEMENT .

1. Nitrogen is a greenhouse gas **- False**
   **Correct statement:** Carbondioxide is a greenhouse gas
2. Poorly developed root is an adaptation of mesopohytes **- False**
   **Correct statmement :** Poorly developed root is an adaptation of Hydrophytes
3. Bats are the only mammals that can fly **- True**
4. Earthworms use the remarkable high frequency system called echoes **- False**
   **Correct statement: Bats** use the remarkable high frequency system called echoes
5. Aestivation is an adapatation to overcome cold condition - **False**
   **Correct statemen**t : Aestivation is an adaptation to overcome hot and dry condition.

## V GIVE REASON FOR THE FOLLOWING.

**1. Roots grow very deep and reach the layers where water is available. Which type of plants develop the above adaptation? Why?**

* Xerophytes and Calotropis are the type of plants develop the above adaptation
* Xerophytic plants grow in a dry habitat.
* The roots of Calotropis develop special structural and physiological characterstics to absorb as much water as they can get from the surroundings.
* Hence the grow very deep and reach the layers where water is available.

**2. Why streamlined bodies and presenceof setae is considered as adaptations of earthworm**?

* Streamlined bodies helps them to live in narrow burrows underground and for easy penetration into the soil.
* Each segment on the lower surface of the body has number of setae.They help the earthworm to move through thesoil and provide anchor in the burrows.

3. **Why is it impossible for all farmers to construct farm ponds it in their fields?**
   All farmers may not be able to constmct a pond in their fields as they occupy a large portion of farmer's lands

## VI ANSWER BRIEFLY

1. **What are the two factors of biosphere?**

* **Biotic** or living factors which include plants, animals and all other living organisms.
* **Abiotic** or non-living factors which include all factors like temperature, pressure, water, soil, air and sunlight which affect the ability of organisms to survive and reproduce.

2. **How do human activities affect nitrogen cycle?**
   Burning fossil fuels, application of nitrogen based fertilizers and other activities can increase the amount of biologically available nitrogen in an ecosystem**.**

3. **What is adaptations?**
   Any feature of an organism or its part that enables it to exist under conditions of its habitat is called adaptation.

4. **What are the challenges faced by hydrophytes in their habitat?**
   Hydrophytes face certain challenges in their habitat. They are:

* Availability of more water than needed.
* Water current may damage the plant body.
* Water levels may change regularly.
* Maintain buoyancy in water.

5. **Why it is important to conserve water?**
   Importance of water conservation:

* It creates more efficient use of water resources.
* It ensures that we have enough usable water.
* It helps in decreasing water pollution.
* It helps in increasing energy saving.

6. **List some of the ways in which you could save water in your home and school?**

* Using a bucket of water to take bath than taking a shower.
* Using low flow taps.
* Using recycled water for lawns.
* Repairing the leaks in the taps.
* Recycling or reusing water wherever it is possible.

7. **What are the uses of recycled water?**
   Uses for recycled water:
   Agriculture, Landscape, Public parks, Golf course irrigation, Cooling water for power plants and oil refineries, Toilet flushing, Dust control and Construction activities.

8. **What is IUCN? What is the vision of IUCN?**
   IUCN is an international organization working in the field of nature conservation and sustainable use of natural resources.
   The vision of IUCN is 'A just world that values and conserves nature'.

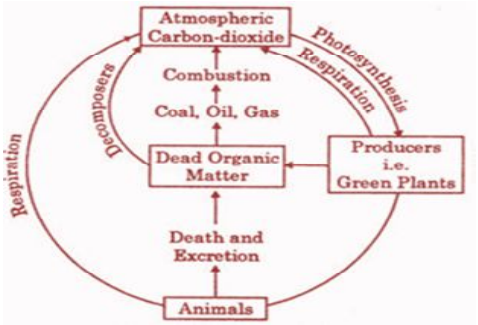
## VI ANSWER IN DETAIL

**1. Describe the processes involved in the water cycle?**

Water cycle or hydrological cycle is the continuous movement of water on earth. In this process, water moves from one reservoir to another, from river to ocean or from ocean to the atmosphere by processes such as evaporation, sublimation, transpiration, condensation, precipitation, surface runoff and infiltration, during which water converts itself to various forms like liquid, solid and vapour.

* **Evaporation**:
  Water evaporates from the surface of the earth and water bodies such as the oceans, seas, lakes, ponds and rivers turn into water vapour.
* **Sublimation**:
  Ice sheets and ice caps from north and south poles, and icecaps on mountains get converted into water vapour directly, without converting into liquid.
* **Transpiration**:
  Transpiration is the process by which plants release water vapour to atmosphere through small pores in leaves and stems.
* **Condensation**:
  At higher altitudes, the temperature is low. The water vapour present there condenses to form very tiny particles of water droplets. These particles come close together to form clouds and fog.
* **Precipitation**:
  Due to change in wind or temperature, clouds combine to make bigger droplets, and pour down as precipitation(rain). Precipitation includes drizzle, rain, snow and hail.
* **Run off**:
  As the water pours down, it runs over the surface of earth. Runoff water combines to form channels, rivers, lakes and ends up into seas and oceans.
* **Infiltration:**
  Some of the precipitated water moves deep into the soil. Then it moves down and increases the groundwater level.
* **Percolation:**
  Some of the precipitated water flows through soil and porous or fractured rock. Infiltration and percolation are two related but different processes describing the movement of water through soil.

**2. Explain carbon cycle with the help of a flow chart**



3. **List out the adaptations of xerophytes?**

**Adaptations of xerophytes:**

* They have well-developed roots. Which grow very deep and reach the layers where water is available. eg Calotropis.
* They store water in succulent water-storing parenchymatous tissues, e.g. Opuntia.
* They have small-sized leaves with waxy coating, e.g. Acacia.
* In some plants, leaves are modified into spines, e.g. Opuntia.
* Some of the xerophytes complete their life cycle within a very short period when sufficient moisture is available.

4. **How does a bat adapt itself to its habitat?**

**Adaptations of bat:**

Bats are the only mammals that can fly.Mostly, bats live in caves.

* **Nocturnality**

Bats are active at night. This is a usefuladaptation for them, as flight requires a lot of energy during day.

* **Flight adaptation**

Forelimbs are modified serve wings. Tail supports and controls movements during flight.

* **Hibernation**

Bats are warmblooded animals but unlike other mammals,they let their internal temperaturereduce whenthey are resting.

They go to a state of decreased activity to conserve energy.

* **Echolocation**

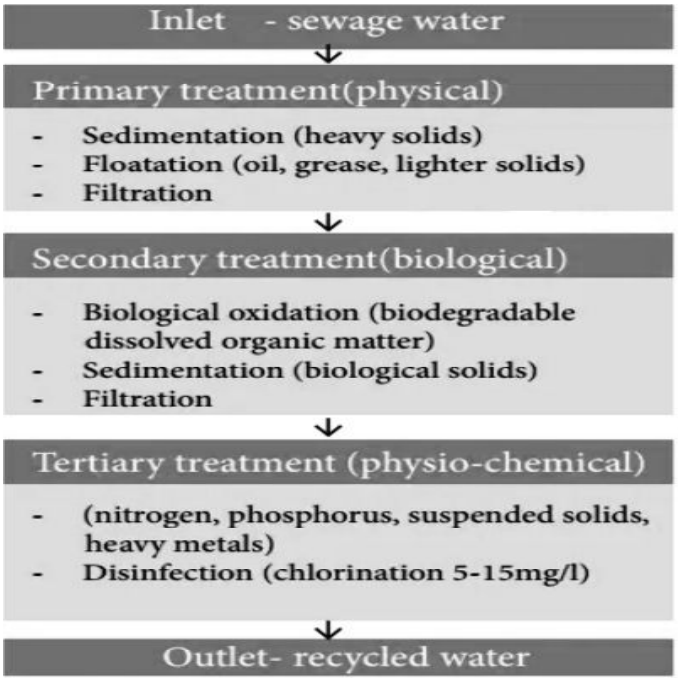
Bats use a remarkablehigh-frequency system calledecholocation. Bats give out high-frequency sounds(ultrasonic sounds).

These sounds are reflected back from its prey and perceived by the ear. Bats use these echoes to locate and identify the prey.

5. **What is water recycling? Explain the conventional waste water recycling treatment?**

Water recycling is reusing treated wastewater for beneficial purposes such as agricultural and landscape irrigation, industrial processes, flushing in toilets and groundwater recharge. Conventional wastewater treatment consists of a combination of physical, chemical and biological processes which remove solids, organic matter and nutrients from wastewater.

The wastewater treatment involves the following stages:




## UNIT 25 LIBREOFFICE IMPRESS

### I. CHOOSE THE CORRECT ANSWER.

1. _____ is a structured delivery of information.
   a) Slide Show  b) Page  c) WordArt  **d) Presentation**
2. The slides are grouped together in a sequence to form _____
   **a) slide show**  b) sharts  c) page  d) messages
3. A presentation consists of many _____
   a) pages  **b) slides**  c) placeholders  d) messages
4. which key should be pressed to run a slide show ?
   a) F1  b) Tab  **c) F5**  d) F2
5. _____ is used to insert attractive text in the slide.
   a) Slide Show  **b) Word Art**  c) Text  d) Header and Footer

### II ANSWER BRIEFLY.

**1. What is LibreOffice Impress?**

LibreOffice Impress is a software that is used to create a presentation with text effect, graphics,sound to make it interesting and effective for the audience. It is a user friendly application software.

**2. What is a Presentation?**

* A presentation is a structured deliveryof information. It is a systematic display of information along with graphics, movies,sound, etc.

**3. What is a Slide?**

* A slide is a single page of a presentation. Collectively, a group of slides may be known as a slide deck.
* A slide show is an exposition of a series of slides or images in an electronic device or in a projection screen.

**4. Write the steps to view a Slide Show.**

To view a slide show, follow the given steps:

* Click the Slide Show tab on the Ribbon.
* Click **From Beginning** from the Start Slide Show group or press F5key on the keyboard to start the slide show from the first slide. Click mouse each time to see the next slide.

**REF TEXT BOOK PAGE NO 142 FOR PERIODIC TABLE OF THE ELEMENTS**